ENVIRONMENTAL MANAGEMENT PROGRAMME

for the management of activities relating to the protection of the natural environment during the construction, operation and decommissioning phases of the

THE PROPOSED ESTABLISHMENT OF A WASTEWATER TREATMENT WORKS AND ASSOCIATED INFRASTRUCTURE ON THE REMAINDER OF ERF 1654, KAKAMAS SOUTH SETTLEMENT

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TABLE OF CONTENTS

LIST OF APPENDIXES

1. INTRODUCTION

The main purpose of this EMPr is to prevent avoidable damage and/or minimise or mitigate unavoidable environmental damage associated with any construction, maintenance, or decommissioning/ demolition work where there is a risk of environmental damage and to enhance positive benefits of the project.

The EMPr forms part of the contractual obligations to which all contractors/employees involved in construction, maintenance, or demolition work must be committed. It serves as a guideline and baseline information document for the construction and operational phases of the proposed development and aims to comply with Section 24N of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), as well as the Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) and any additional specific information requested by any State Department, including the competent authority.

This EMPr:

- identifies project activities that could cause environmental damage (risks) and provides a summary of actions required;
- identifies persons responsible for ensuring compliance with the EMP and provides their contact information;
- provides standard procedures to avoid and/or minimise the identified negative environmental impacts and to enhance the positive impact of the project on the environment;
- provides site and project specific rules and actions required, including a site plan/s showing:
    - areas where construction, maintenance, or demolition work may be carried out;
    - areas where any material or waste may be stored;
    - allowed access routes, parking and turning areas for construction or construction related vehicles;
- forms a written record of procedures, responsibilities, requirements and rules for Contractor/s, their staff and any other person who must comply with the EMPr;
- provides a monitoring and auditing programme to track and record compliance and identify and respond to any potential or actual negative environmental impacts; and
- provides a monitoring programme to record any mitigation measures that are implemented;

The EMPr is partly prescriptive (identifying specific people or organisations to undertake specific tasks, in order to ensure that impacts on the environment are minimised), but it is also an open-ended document in that information gained during the construction activities and/or monitoring of procedures on site could lead to changes in the EMPr.

This EMPr was compiled by Maboe Nthejane who has a MSc. Degree in Botany (Plant Ecology). He has been working as an environmentalist since 2006 and is currently employed at EnviroAfrica cc.

Qualifications:

- BSc., majoring in Biology and Physical Geography (1996);
- BSc. Hons): Botany (2004); and
- MSc. Botany (Plant Ecology)

Expertise:
Maboee Nthejane has more than 15 years of experience in the environmental management field as an Environmental Control Officer, Environmental Consultant and Environmental Officer, having worked on a variety of projects in the kingdom of Lesotho, the Free State, Western Cape, Eastern Cape and Northern Cape Provinces.

EAPASA Registration No.: 2022/4942

1.1 PURPOSE

The purpose of the EMPr is to give direction and guidance to all responsible parties, which are in turn expected to co-operate closely to minimise or avoid unnecessary environmental impacts or delays. The Environmental Control Officer ("ECO") will ensure compliance with the EMPr (and other Environmental issues) and will visit the site on a regular basis during the construction phase, with additional visits at the professional, project-linked, discretion of the ECO or relevant authority.

This EMP binds all contractors, sub-contractors and other persons working on the site to adhere to the terms and conditions of the EMPr throughout the construction activities of the project and any other construction activities associated with the construction of the upgrade of the site.

Any other Site-Specific additional activities decided and agreed upon at the "On Site Start-Up Meeting" must be included to form part of the EMPr.

1.2 SCOPE

This EMPr addresses the construction phase (CEMPr) and operational phase (OEMPr) and all activities associated with the development proposal. In addition it will deal with all the requirements of Regulation 19 (4) of the EIA Regulations of 2014 (as amended) as well as any additional specific information requested by the competent authority pertaining to some developments.

Compliance with this EMPr (which serves as a basis for all the phases of the project) will be monitored by the ECO. The Construction Engineer/Project Managers, the Contracting Agent(s) and the Applicant will be responsible for the implementation of this EMPr.

1.3 SITE LOCATION

The proposed site is located on the Remainder of Erf 1654, Kakamas South Settlement. The proposed site for the WWTW and associated infrastructure is located on the Remainder of Erf 1654, Kakamas South Settlement. This is on the south-western outskirts of the town of Kakamas. The proposed site slopes gently downwards from the south towards the Orange River in the north, with active agricultural fields located immediately to the west and a residential area located approximately 1.5km to the north-east of the proposed WWTW. Please refer to Figure 1 and Table 1 below.

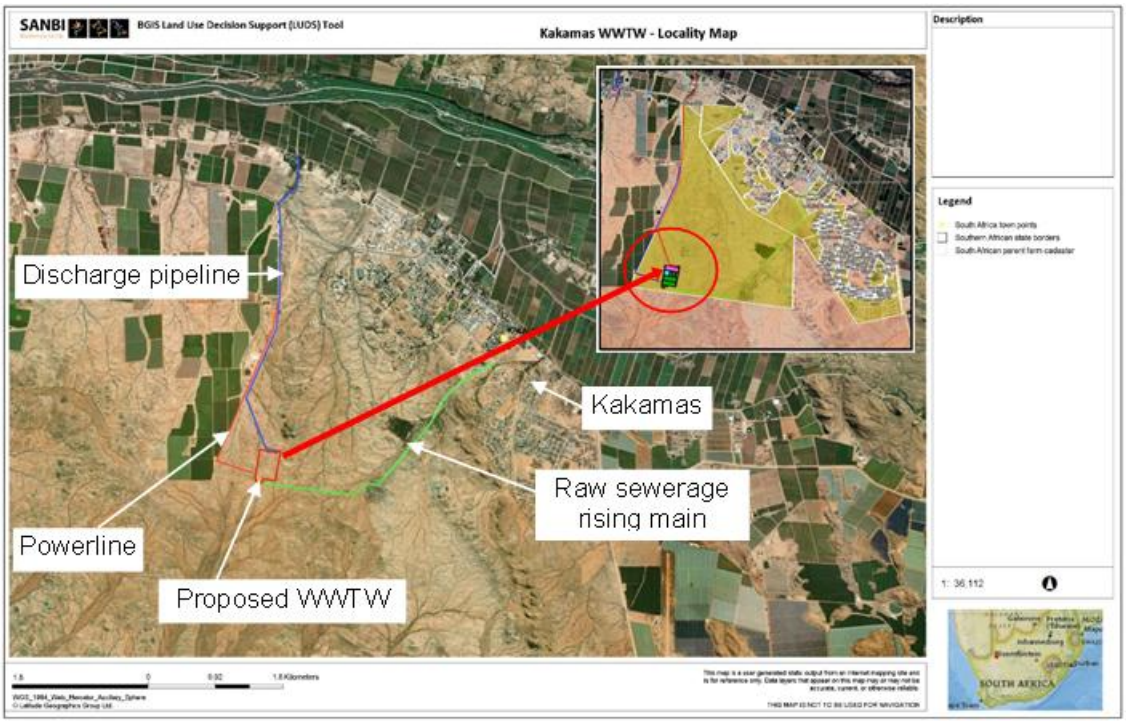

FIGURE 1: SANBI BGIS image of the locality of the proposed WWTW and associated infrastructure

TABLE 1: Geographic co-ordinates for the proposed WWTW

Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
Proposed WWTW site					
28º	47’	30.44”	20º	35’	47.11”
Proposed raw sewage pipeline route					
28º	46’	50.71”	20º	37’	26.44”
28º	46’	57.74”	20º	37’	12.77”
28º	47’	15.78”	20º	36’	57.50”
28º	47’	38.14”	20º	36’	35.34”
28º	47’	37.36”	20º	36’	30.32”
28º	47’	42.00”	20º	36’	24.72”
28º	46’	50.71”	20º	37’	26.44”

Proposed treated sewage pipeline route					
28º	47’	23.7”	20º	35’	45.92”
28º	47’	04.32”	20º	35’	37.61”
28º	46’	37.33”	20º	35’	50.66”
28º	46’	24.84”	20º	35’	51.81”
28º	45’	49.69”	20º	37’	26.44”
28º	45’	51.06”	20º	35’	52.01”
28º	45’	44.35”	20º	35’	59.26”
28º	35’	30.88”	20º	35’	59.65”

1.4 PROJECT DESCRIPTION

The development proposal entails the establishment of a conventional oxidation pond WWTW of approximately 2000m^3/ day in capacity and some associated infrastructure on the Remainder of Erf 1654, Kakamas South Settlement. The proposed WWTW and associated infrastructure will serve the town of Kakamas and includes *inter alia,* the following:

- Operational Building/Shelter Inlet Works (inclusive of tanker truck discharge facility)
- Screenings Removal
- Grit Channels
- Flow measurement
- Anaerobic Ponds x 2 (lined with HDPE membrane)
- Facultative Ponds x 2 (lined with HDPE membrane)
- Aerobic Ponds x 3 (lined with HDPE membrane)
- Final Storage Pond (lined with HDPE membrane)
- Horizontal Flow Reedbed (to filter out TSS to achieve General Limit)
- Disinfection facility 3.57km x 250mm diameter Wastewater Rising Main pipeline
- 3.87km x 300mm diameter, Treated Effluent Gravity Main from WWTP to Orange River
- 2kV x 2.5km overhead Electrical Power supply line + Transformer

The following are the geographic co-ordinates for the proposed WWTW and associated infrastructure:

1.5 THE RECEIVING ENVIRONMENT

The proposed WWTW and associated infrastructure is located on a plain that slopes gently from the south towards the Orange River in the north. The gently sloping site is scarred by numerous drainage lines and their tributaries as is typical in most parts of the Northern Cape Province. In addition, the proposed site is located within an ESA, with associated the raw sewage pipeline as well as effluent pipeline extending into a CBA 2 identified on SANBI BGIS. Please see Figure 2 below.

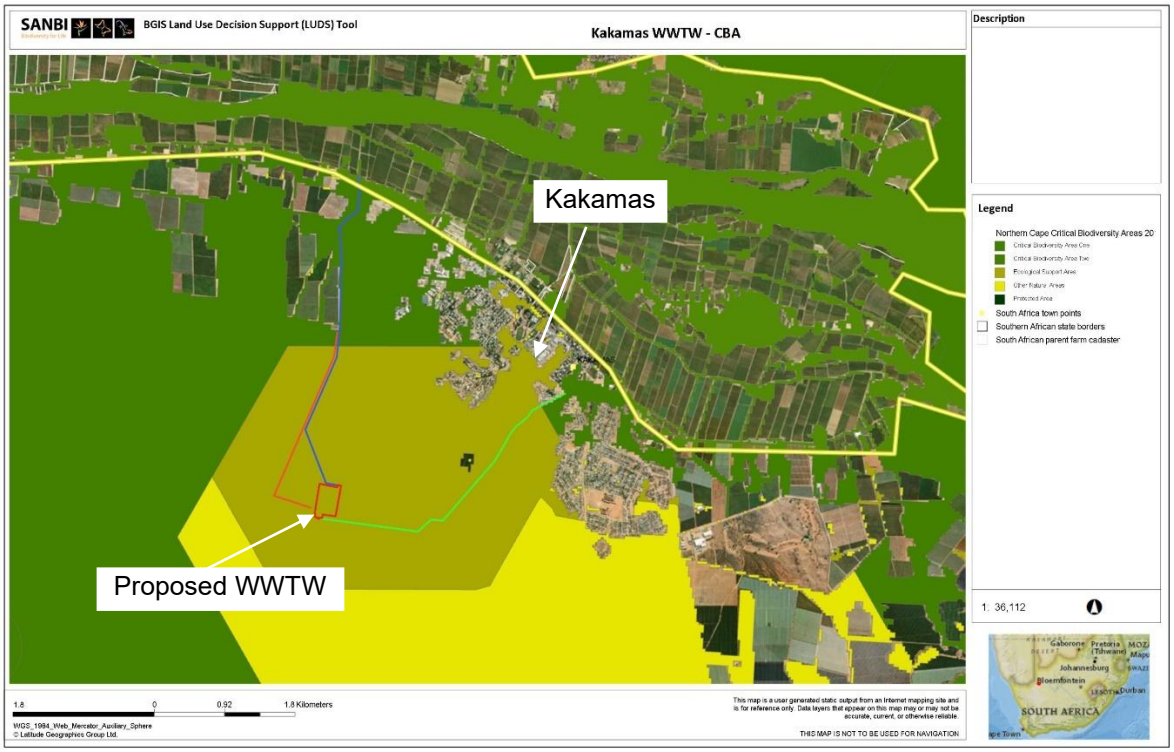

FIGURE 2: SANBI BGIS image of the ESAs and CBAs in and around Kakamas

It is stated in Terrestrial Biodiversity Compliance Statement (Appendix D1, refers) that the landscape is relatively homogenous and does not contain any significant biophysical features that might have resulted in special habitats for fauna or flora.

1.5.1 VEGETATION TYPES EXPECTED

It is stated in the Terrestrial Biodiversity Compliance Statement that in accordance with the 2018 Vegetation Map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006), the development proposal will only impact on one vegetation type, namely Bushmanland Arid Grassland, a vegetation type considered "Least Threatened" in terms of the NEM: BA "national list of ecosystems that are threatened and in need of protection" (GN 1002, December 2011).

This was confirmed by the appointed terrestrial biodiversity specialist during a visit to the proposed site.

It is further stated in Biodiversity Assessment (Appendix D1) that the landscape is relatively homogenous and does not contain any significant biophysical features that might have resulted in special habitats for fauna or flora.

1.5.2 SURFACE WATER

The proposed WWTW overlaps a freshwater Ecological Support Area (ESA) and the associated pipelines extend into a freshwater Critical Biodiversity Area (CBA) 2 as depicted in Figure 3 below.

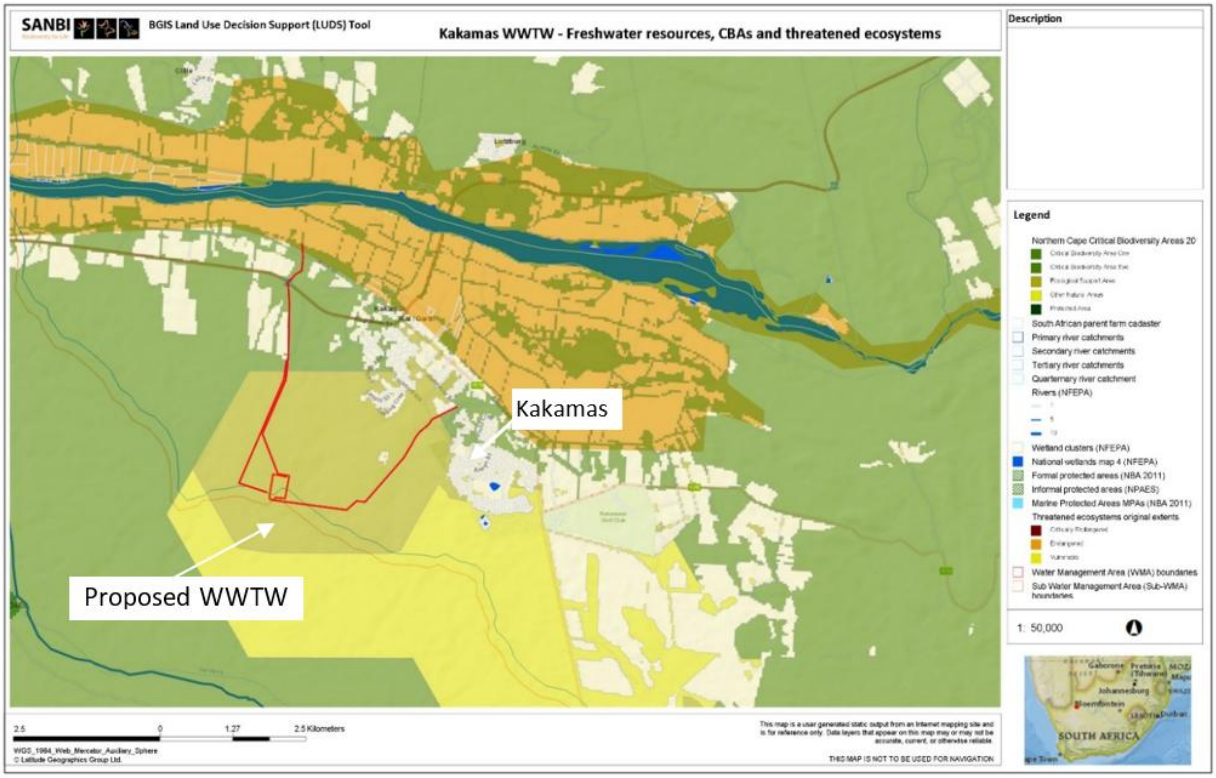

FIGURE 3: SANBI BGIS image of the Freshwater resources, CBAs and threatened ecosystems around Kakamas

The proposed site also overlaps five sub-catchments that are traversed by drainage lines and many criss-crossing tributaries as is characteristic over much of the landscape in the Northern Cape Province. The five sub-catchments overlapping the proposed site are in a more disturbed state closer to the Orange River and are in a more natural state further off from the river. The boundaries of the sub-catchments are indicated in navy blue and the drainage lines are indicated in light blue in Figure 4 below.

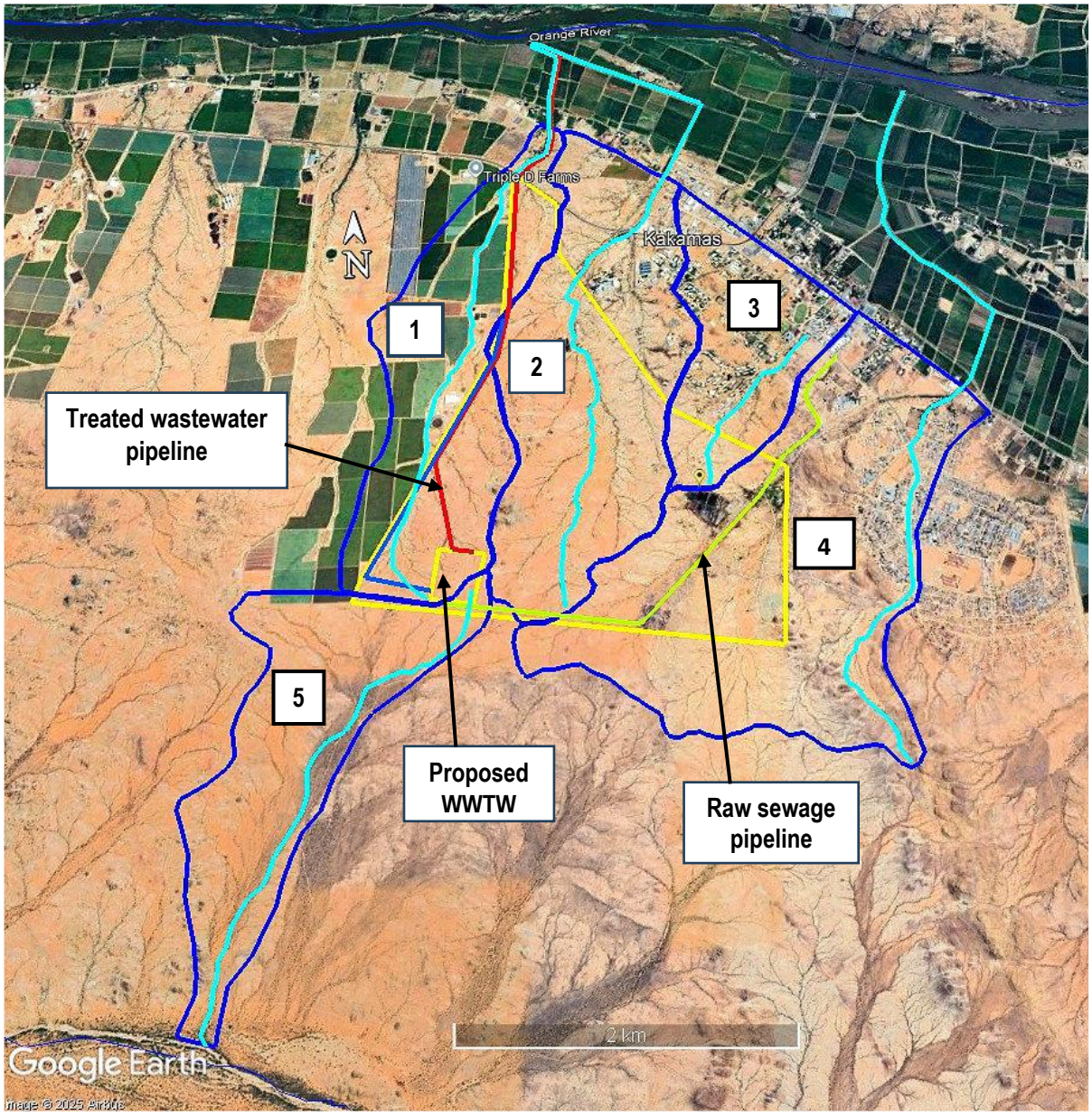

FIGURE 4: View of the five sub-catchments as well as drainage lines overlapping the proposed site

It is evident in Figure 3 above that the proposed site for the WWTW is intersected by a drainage line that flows in a north to south direction through Sub-catchment 1. The drainage line flows mostly along the western parts of Sub-catchment 1 on its way to the Orange River and is supplied with water by several tributaries from the east as well as a tributary from the west. The tributary from the west is straightened and engineered as is the case with the drainage line closer to where the drainage line crosses the N14 National Road. The drainage line near the southern verge of the N14 Regional Road is overgrown with black thorn, whereas it is reeds that dominate the drainage line on the northern roadside.

The drainage line of Sub-catchment 2 flows in a north to south direction through the middle of the Remainder of 1654, Kakamas South and divides the said property into eastern and western portions of almost equal size. This drainage line is supplied with water by tributaries from both the east and west and is bigger than the drainage line of Sub-catchment 1.

The anthropogenic disturbance closer to the Orange River is higher, consisting of vineyards, farm roads, canals and flood control walls as well as a section where the drainage line is engineered to turn almost 90°.westwards and follow the boundary of a vineyard.

The drainage line in Sub-catchment 4 flows in a south to north winding manner close to the eastern boundary of the sub-catchment and continues on its way to the Orange River. The proposed pipeline for conveying raw sewage from the town of Kakamas extends southwards in close proximity to the western boundary of this sub-catchment and continues past the existing WWTW. The pipeline then turns westwards on its approach to the northern boundary of the sub-catchment and continues to its end-point at the proposed WWTW.

The impacts within this sub-catchment include the proliferation of black thorn at the existing WWTW and the inadequately treated wastewater that flows in an earthen canal towards the town of Kakamas. The canal passes underneath Voortrekker Road, *i.e*., one of the main roads through Kakamas and through a set of pipe culverts and then a concrete canal to Orange River.

The Kakamas solid waste disposal site has also resulted in major impacts in Sub-catchment 4, together with the large quantities of waste dumped unlawfully on the side of the road that leads from town and past the existing WWTW. In addition, a significant impact within the sub-catchment has been caused by a significant part of Kakamas occupying in the northeastern corner of the sub-catchment.

The very upper reach of the drainage line in Sub-catchment 5 extends onto the proposed site of the WWTW and then flows southwards to join the Hartbees River. This sub-catchment seems to have been impacted the least, with the noted impacts being only grazing by livestock and footpaths caused by trampling.

The proposed WWTW and associated infrastructure do not extend into Sub-catchment 3 and so this sub-catchment will not be dealt with.

1.5.3 ARCHAEOLOGICAL, HERITAGE AND PALAEONTOLOGICAL RESOURCES

According to the Heritage Impact Study Report (Appendix D3 of the Draft BAR, refers), the following heritage resources exist on the proposed site:

Three instances (KSS/1654/001, KSS/1654/004, and KSS/1654/005) of Middle Stone Age (MSA) lithic scatters/occurrences were recorded. These resources are given a 'General' Protection C (Field Rating IVC) and are considered to be of low significance. The impact is negligible. Therefore, no further mitigation is recommended.

One instance of a possible grave was recorded and a cemetery. All graves are of High significance and should be protected. However, none of the grave sites fall within the proposed development footprint, so neither will be impacted. Although the chance of impact occurring is extremely low (less than a 25% chance of occurrence), any possible impact can be avoided by implementing a precautionary 30m buffer (no-go) zone around the grave sites. After mitigation this would have a Low negative significance impact.

It is stated in the HIA that an Exemption for a Palaeontological Impact Assessment is recommended for the WWTW at Kakamas South Settlement, as the proposed site "is underlain by unfossiliferous Riemvasmaak Gneiss (MRM) as well as the Kenhardt Magmatite (MKM) and potentially fossiliferous Quaternary alluvium (QG). However, the Quaternary sediments are not highly fossiliferous". However, If during construction, any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA must be alerted as per section 35(3) of the NHRA.

If unmarked human burials are uncovered, the SAHRA must be alerted immediately as per section 36(6) of the NHRA. Depending on the nature of the finds, a professional archaeologist or palaeontologist must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources are of archaeological or palaeontological significance, a Phase 2 rescue operation may be required, subject to permits issued by SAHRA.

The potential heritage-related impact of establishing the proposed WWTW on the proposed site is therefore of low significance upon implementation of the required impact mitigation measures

1.6 RECOMMENDATIONS ON IMPACT MITIGATION/MINIMISATION

The following are site/project specific impact mitigation measures recommended by the appointed specialists and must be implemented if the proposed development is approved.

Terrestrial Biodiversity:

- All on-site work must be done in accordance with an approved construction and operational phase EMPr, which must be developed by a suitably experienced Environmental Assessment Practitioner.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the mitigation recommendations contained in this EMPr.
- All construction should be done in accordance with an approved construction phase EMPr approved by the competent authority.
- A suitably qualified ECO should be appointed to monitor the construction phase in terms of the EMPr and any other conditions pertaining to specialist studies.
- Before any work is done the footprint must be clearly demarcated. The demarcation must aim at minimisation the impact on SoCC.
- A "Search & Rescue" operation must be implemented: A botanist or a suitably qualified ECO must inspect the demarcated routes for plants SoCC that needs to be searched & rescued .
- Search & Rescue must include an aftercare period, during which the plants are watered from time to time to give them the best possible chance of survival.
- All efforts should be made to protect all mature indigenous trees (e.g., *Pappea capensis* individuals). o Northern Cape Nature Conservation Act permit must be obtained for the potential impacts on the NCNCA protected species.
- A NEM:BA permit must be obtained, should any of the *Hoodia gordonii* individuals have to be re-planted.
- All alien invasive species within the footprint and its immediate surroundings must be removed responsibly. Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g., spreading of these species due to incorrect eradication methods);
- Care must be taken to dispose of alien plant material responsibly.
- An integrated waste management approach must be implemented during construction and all waste within the footprint area must be removed and disposed to the local Municipal waste disposal site. Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.

Freshwater:

- The Applicant must attempt to commence with and complete construction during the dry season and must put in place and maintain measures to keep stormwater away from the proposed site during the construction phase
- Maintain buffer areas between the proposed development and drainage lines as much as possible
- Minimise disturbance to the on-site drainage lines so as to preserve the drainage lines as much as possible
    - Prevent loose soil and debris from washing away down the on-site drainage lines
    - Place the raw sewage pipeline and the treated wastewater pipeline sufficiently deep underground to help prevent future washing away during severe storms at the intersections of the pipelines with drainage lines and provide at least 1m thick cover of compacted backfill thereon.

- Provide a portable toilet for every 15 workers on the proposed site and the toilet must be tied down to prevent them from being blown over. The toilets must be provided with toilet paper at all times and the sewage in the toilets collected regularly and discarded at a WWTW.

- Maintain the WWTW and raw sewage pipeline as well as the effluent pipeline in the required manner so that the WWTW and associated infrastructure continue to operate effectively.

Heritage

- A distance of at least 30m must be maintained between the development proposal and any suspected grave or cemetery.
- Should any human remains or heritage resources be exposed during excavations or any other actions on site, these must immediately be reported to the South African Heritage Resources Agency. Heritage remains uncovered or disturbed during earthworks must not be further disturbed until the necessary approval has been obtained from the South African Heritage Resources Agency.
- If Palaeontological resources are uncovered on the proposed site, the Chance Find Protocol must be implemented immediately. Fossil discoveries must be protected and the ECO/site manager must report to the South African Heritage Resources Agency (SAHRA) so that mitigation (recording and collection) can be carried out.

  Before any fossil material can be collected from the development site, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork (at the cost of the Applicant) must meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).

Agriculture:

No impact management or mitigation measures

Visual

- The Construction phase should be completed as soon as possible
- Post-construction rehabilitation should be completed as soon as possible

Socio-economic:

- **Preferential procurement of goods, services and labour**

  Construction and Operation
  - Contractors, employing or seeking to employ local Historically Disadvantaged Individuals ("HDI") who are suitably qualified should get preference;
  - The developer should where necessary, assist local HDI owned firms to complete and submit the required tender forms on condition that local labour is used;
  - Give as many employment opportunities to women as practicable.
  - Pay men and women doing the same work equally.
  - Ensure that women gain equal access to training and education opportunities as men do.
  - Construction workers should be sourced from the local area as much as is practicable.
  - Local businesses should be given first preference in the procurement process for service providers and suppliers of construction materials.

- The Applicant should work through a community liaison officer to ensure that the local community is kept informed on the project and is provided with a channel for addressing any concerns or grievances that may arise.

- **Security Control**

Construction
- Regularly alternated 24 hours security to guard the WWTW and associated infrastructure.
- Documentation of all movement and vehicles entering and leaving the premises.
- Regular searching of all vehicles entering and leaving the premises.
- No persons not concerned with the development to enter on the premises.

- **Safety Management**

Construction and Demolition
- Adhere to construction health and safety standards and precautionary measures.
- Provide health and social training amongst the project team and in the community.
- Make effort to ensure that the construction team and their families meet regularly (monthly).

- **Traffic Regulation**

Construction
- Adhere to national traffic safety standards and precaution measures.

- **Dust and Noise control**

Construction
- Dust must be kept under control as per the relevant legislation.
- Noise should be kept under control as per the relevant legislation.
- Enforce strict operating hours for heavy vehicles and construction activities on site to reduce noise and dust impacts on adjacent landowners.
- Implementation dust suppression measures;
- Access must be on recognized routes.
- littering must be strictly prevented.
- All construction waste and building rubble and demolition waste and rubble must be removed from site.

Construction phase
- An ECO must be appointed to oversee the construction process and ensure compliance with conditions of approval.
- Contractor to sign and undertake to comply with Environmental Specifications.
- Demarcate sensitive areas and no-go areas with danger tape to prevent disturbance during construction.
- Pre-construction, keep disturbed areas to a minimum. No clearing of land to take place outside the demarcated footprint.
- Throughout construction, identify suitable areas within the construction site for fuel storage, temporary workshops, eating areas, ablution facilities and washing areas.
- Throughout construction institute a solid waste management programme to minimise waste generated on the construction site and recycle where possible.
- Throughout construction reduce and control dust using approved dust suspension techniques as and when required.
- Construction to occur only during the day. Should the ECO authorise night work, low flux and frequency lighting must be used.

- Throughout construction, rehabilitate all disturbed areas in accordance with the development plan.
- A photographic record of the site and its immediate surrounding area must be kept as part of the EMPr to serve as a baseline for measurement of all future visual impacts.
- Excavation on the site is to be kept to the absolute minimum required for the successful implementation of the project.
- Any necessary lighting must be shielded in such a way that direct light is not allowed to escape into the surrounding terrain or up into the sky. Only the areas that need to be lit must be lit.

Operational (sludge and water)

- Littering is to be strictly prevented on the site.
- Domestic waste is to be regularly removed from the facility to a suitably licensed waste disposal site.
- Maintain access roads to prevent scouring and erosion, especially after rains.
- Monitor the use of lighting over the entire life of the WWTW to minimise light pollution.
- All lighting must be installed at downward angles.
- Consider the application of motion detectors to allow the application of lighting only where and when it is required.
- Only minimum wattage light fixtures must be used.
- A strict fire prevention policy must be implemented and monitored.
- Screen the site with endemic vegetation to minimise the visual impact.
- The intersections of the pipelines with the on-site drainage lines must be landscaped following construction to help prevent erosion or pooling when it rains. These crossings must be monitored regularly so that they can be repaired soon if any signs appear of erosion or flood damage
- Monitor quality of treated wastewater and make required adjustments to operations accordingly.
- Make public, the results of the tests conducted on the treated wastewater discharged by the WWTW
- Groundwater quality must be monitored at a downstream borehole and any adjustments that appear necessary at the WWTW for improving the groundwater quality must be made. In addition, the results of the groundwater quality monitoring must be made public.
- Keep the site free of litter
- The depth of sludge in the oxidation ponds must be measured annually and the sludge sampled and subjected to laboratory tests. It is anticipated that every seven years, the sludge will have accumulated to more than 50% of the capacity of the oxidation ponds and so the sludge will be remove extracted and disposed of.
- If the results of laboratory testing indicate that the sludge is suitable for usage as fertiliser, the sludge may be dried and then supplied to farmers for usage as fertiliser. However, should laboratory testing indicate that the sludge is unsuitable for usage as fertiliser, the sludge will be disposed of at a suitably licenced waste disposal site determined together with the National Department of Water and Sanitation and the required chain of custody records must be kept and produced upon request to the relevant officials.

- **Loss of ecological infrastructure (freshwater and biodiversity)**

All phases

- Immediate stabilisation and rehabilitation of disturbed areas during the construction phase, as stormwater can wash sediment and waste down drainage lines and ultimately into the Orange River.
- Indiscriminate clearing of any area outside of the footprint must be prevented.

Construction Phase:

The site should be developed with as little disturbance as possible to make post-construction rehabilitation easier:

- Strip and stockpile topsoil from all areas where soil will be disturbed.

- After cessation of disturbance, re-spread topsoil over the surface.
- Dispose of any sub-surface, clay spoils from excavations where they will not impact on vegetated land, or where they can be effectively covered with topsoil.

Construction and Operational

- Implement strict stormwater management and erosion control: Implementation of an effective system of stormwater run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.

1.7 ENVIRONMENTAL AUTHORISATION

The Conditions of approval of the Environmental Authorisation ("EA") and other relevant approvals/licences from other authorities must be included as Appendix 1 of the final EMPr. The conditions of approval must be adhered to as part of the EMPr.

EA (Environmental Authorisation) Conditions of Approval – Appendix 2.

2. DEFINITIONS AND ABBREVIATIONS:

2.1 DEFINITIONS

Applicant: The person or responsible person from an organization who applied for the proposed activity described in the Environmental Authorisation.

Audit (Site Completion): Environmental Site Inspection and verification of construction activities to EMP

Bund: Enclosure under / around a storage facility to contain any spillage

Batch plant: a concrete or plaster mixing facility and associated equipment and materials.

Construction: means the period of the project during which the actual works are carried out, deemed to include site establishment, site preparation, the works, maintenance period and decommissioning.

Construction phase: The construction phase period of a cellular communications Construction site is defined as from the commencement of site establishment up to and including the practical site handover.

Construction site: means the area influenced and affected by the construction activities or under the control of the Contractor often referred to as "the Site".

Construction Supervisor: The person responsible (appointed by the owner) to ensure that the construction is carried out to completion on time, within budged and that the Contractor fulfils his obligations in terms of the EMP.

Contaminated water: means water contaminated by the Contractor's activities, *e.g.* concrete water and runoff from plant/ personnel wash areas.

Contractor: the principal persons / company and all other sub-contractors involved in the construction of the project.

Contractor's camp: means the designated and suitably demarcated areas on the Site within which all site offices and staff facilities are situated and within which equipment will be stored, for instance, batching plant, crusher plant, sand washing plant, workshop, offices, rest areas, ablution areas, etc., whichever is applicable.

Declaration of understanding: Form that is signed by all contractors involved in the construction works of their understanding and acceptance of the EMP and site-specific additions to the EMP.

Development site: boundary and extent of development works and infrastructure.

Environment: means the surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part of the combination of the above two bullets and the interrelationships between them;
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being

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

Environmental Audit Report: report done by the ECO and submitted by the Applicant to the satisfaction of the Chief Directorate Environmental Affairs, within six months after construction has been completed and also after the site(s) has been rehabilitated.

Environmental Control Officer: The registered Environmental Scientist (*in terms of section 20(3) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003)*) responsible for overseeing the environmental aspects of the Construction phase of the EMP.

Environmental Completion Statement: A report by the ECO to the relevant authorities stating completion of the project and compliance with the EMP and its conditions.

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

Method statement: A statement by the Contractor, describing the scope of intended construction works step-by-step, in order for the ECO and Construction Supervisor to understand the Contractors intentions and be able to comment on, so that they could assist with devising mitigating measures should it be necessary to avoid environmental impact.

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

Owner: The owner, or dedicated person, responsible for the management of the property on which the proposed activity (in terms of the ROD) will be performed.

Stop Works Order: An order which can be issued either by the ECO or Construction Supervisor to the Contractor (or any sub-contractor) if serious environmental damage is about to happen or is happening as a result of construction activities. On receiving such an order the Contractor must immediately stop all activities (or planned activities) relevant to the specific issue until an environmentally friendly resolution has been approved by the ECO.

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

Site meetings: Periodic (weekly or monthly) meetings between the ECO, Construction Supervisor and Contractor to discuss construction activities that relate to the environment or any other environmental issues that might arise.

Works: The works to be executed in accordance with a contract.

On-site start-up meeting: a start-up meeting held on site, before any construction has begun to discuss EMP and determine site specific additions that will be included as the basis for the EMP.

Potentially hazardous substance: is a substance, which, in the reasonable opinion of the Engineer, can have a deleterious (detrimental) effect on the environment.

Method statement: is a written submission by the Contractor to the Engineer or relevant responsible person

Reasonable: means unless the context indicates otherwise, reasonable in the opinion of the Engineer/Project Leader after he has consulted with a person, not an employee of the client, suitably experienced in "environmental implementation plans" and "environmental management plans", both as defined in the Environmental Management Act (Act No 107, 1998).

Solid waste: means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Precautionary principle: means the basic principle, that when in doubt or having insufficient or unreliable information on which to base a decision, to then undertake actions that will have minimum risk.

2.2 ABBREVIATIONS

CA	Competent Authority
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CEMP	Construction phase Environmental Management Plan
ECO	Environmental Control Officer: - Must be a suitably qualified and experienced environmental consultant appointed to help ensure compliance to the EMPr
EMPr	Environmental Management Programme
ESO	Environmental Site Officer - Must be a person with adequate environmental knowledge to understand and implement the EMPr by conducting on-site inspections determined by the ECO and the client.
ER	Engineer's Representative or Main contractors Representative
EA	Environmental Authorisation issued by competent authority for construction to be commenced with under certain environmental compliances
MSDS	Material Safety Data Sheet(s)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
OEMPr	Operational Environmental Management Plan
OSSM	On-site Start-up Meeting
SAHRA	South African Heritage Resources Agency

3. CONSTRUCTION PHASE EMPR

3.1 STRUCTURE AND RESPONSIBILITY

Implementation of the EMP and environmental control and management of the construction phase will be achieved through the responsibility structure set out below. The role players include the Applicant, the Construction Supervisor, the Environmental Control Officer and the Contractor. All role players must familiarize themselves with the prescriptions of the EMPr.

3.1.1 THE APPLICANT

The client (or the designated responsible person appointed by him) is responsible for:

- appointing a suitably experienced ECO, the Construction Supervisor and the Contractor for the duration of the construction contract, and
- ensuring that the Construction Supervisor and Contractor fulfil their obligations in terms of this EMPr.

3.1.2 THE CONSTRUCTION SUPERVISOR

The Construction Supervisor is responsible for ensuring that construction work is carried out to completion, on time, within budget and that the Contractor fulfils his obligations in terms of the EMPr. In addition, the Construction Supervisor and the ECO must develop a close working relationship and to stay in contact with each other.

The responsibilities of the Construction Supervisor include:

- To issues site instructions to the Contractor.
- To serve as conduit for all communication between the ECO and the Contractor [The only exception is where the ECO or the Construction Supervisor needs to issue a "**STOP WORKS**" order on the contractor if serious environmental harm is about to happen or is happening as a result of construction activity. The "STOP WORKS" order must be confirmed by the other party as soon as reasonably possible].
- Discussing any problems that might lead to environmental damage with the ECO.
- When the ECO is not on site the Construction Supervisor will be responsible for the implementation of the EMP.

3.1.3 THE CONTRACTOR

The Contractor shall be responsible to:

- ensure that all sub-contractors, employees, suppliers, agents etc. are fully aware and adhere to the environmental conditions detailed in the EMPr;
- liaise closely with the Construction Supervisor and the ECO;
- ensure that works on the site are conducted in an environmentally sensitive manner and in full accordance with the EMPr;
- carry out instructions issued in the site instruction book;
- assist with solutions to environmental problems that may arise during the construction phase; and
- ensure that all "**No-Go**" areas are adequately fenced off.
- will report any deviation from the requirements of this EMP to the Principal Agent, and any pollution or environmental contaminant spill events.
- agrees to work stoppage and/or payment of penalties as required by this EMP and directed by the ECO/Construction Supervisor.

- agrees bear full costs for any work stoppage resulting from contravention of the requirements of this EMP, and/or the costs of remedying environmental damage resulting from their or their sub-contractors or employee's contravention of the requirements of this EMP.

NB: All contractors must sign the "Declaration of understanding" (Appendix 1 of this document) of this Environmental Management Plan before construction commences.

3.1.4 THE ECO

The ECO is responsible for overseeing the environmental aspects of the Construction phase and will work in close co-ordination with the Construction Supervisor.

3.1.4.1 ECO qualifications

The ECO must be suitably qualified (a diploma or degree in environmental management with at least 2 or more years of environmental site management experience) and must have a sound knowledge of the environment where the development proposal will take place.

3.1.4.2 ECO duties

An ECO must be appointed for the duration of the construction phase (or as required by the EA). The ECO:

- will be primarily responsible for ensuring the implementation of the EMPr and will perform regular site inspections with the specific aim of ensuring environmental conformance by the Contractor;
- to visit the site on a regular basis while construction is in progress. Frequency of site visits is recommended at least once per month, or as determined by the Competent Authority;
- will keep environmental records (including photographs) of the construction activities;
- must ensure that "No-Go" and "Open Space" areas are adequately protected and adhered to;
- must approve and be present during the demarcation of the necessary areas for storage of materials, ablutions, eating areas of contract workers etc;
- to conduct a start-up meeting before construction work commences and will provide environmental training at the beginning of the project and will provide environmental awareness training throughout the life of the project;
- must be informed of site and technical meetings to be able to comment and report on environmental issues;
- will call for, and must first approve method statements for construction activities that might pose a significant environmental impact and must ensure that method statements have been approved before commencement of the work;
- must implement immediate mitigating measures in the case of critical environmental impacts
- must deal with public complaints/ queries regarding environmental issues;
- will record his findings and all environmental non-conformances in an environmental completion report (which will be forwarded to the Client and the Construction Supervisor);
- will conduct a closing down visit as soon as possible after completion of the approved development;
- will commission an independent Environmental Compliance Audit within six months after completion of the contract.

3.1.4.3 ECO Authority

The ECO has the authority to stop works if there is a serious threat to or impact on, the environment as a direct cause of construction. However, this authority is limited only to emergency situations where immediate consultation with the Construction Supervisor is not possible.

- The ECO is to inform the Applicant and site representative of the reasons for the stoppage as soon as possible. A relevant reason should be supplied as soon as possible after stoppage of such works.
- Upon failure by the contractor or his employee to show adequate consideration to the environmental aspects of this contract, *i.e*., wilful destruction of the environment, the ECO may recommend to the Applicant or site representative to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied.
- No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

3.1.5 HEALTH AND SAFETY OFFICER:

A Health and Safety (H&S) Officer for the project must be designated or appointed by the Contractor or Principal Agent, and his/her role is to support the successful implementation of the EMP through:

- Site evaluation on a regular basis.
- Identifying issues relating to day to day construction activities and that can have a detrimental effect on the environment.
- Subcontractor audits to ensure compliance.
- Assist in the direct implementation of the EMP.
- Ensure that the requirements of the EMP are communicated understood by personnel on site *via* induction sessions.
- Ensure that the contractors on site develop, implement and monitor the required H&S management functions.
- Evaluate the applicability and accuracy of the EMP and the method statements throughout the construction phase.
- Coordinate all statutory requirements including permit authorisation and license requirements.
- Conduct or have conducted a hazard analysis and take the necessary corrective action.
- Where it is not possible to remove any remaining hazard's to inform employees thereof and what precautionary action is to be taken.
- Detail mitigation measures required to be taken, and the procedures for their implementation to the project manager.
- Representing H&S issues at the production meetings.
- Coordinate H&S training of personnel.
- Coordinating spill response personnel.
- The H&S officer shall inspect the integrity of the hazardous waste containers/bins/skips on a weekly basis.

3.1.5.1 Health and Safety Officer qualifications

The Health and Safety Officer must be independent and suitably qualified, with sound knowledge of the Occupational Health & Safety Act, 1993 (Act No. 85 of 1993) and must have experience of the implementation of the Act with regards to the construction in the environment where the development proposal will take place.

3.2 COMMENCEMENT OF WORKS

The site project contractors must timeously be given a copy of the construction phase EMPr and any additional information that pertains to site conditions/amendments or deviations from original site plan.

- This EMPr must be included in the Contractors site specification documentation.
- A copy of the EMPr must be kept on site at all times and remain available for presentation to any relevant authority requesting to see such document.

NO WORK ON SITE MAY TAKE PLACE UNTIL:

- The Declaration of Understanding/Environmental Contract is signed between the relevant parties.
- At least one week's written notice (or as specified in the EA) must be given to the competent authority before commencement of any construction activity (As per EA – if required).
- On-Site Start-Up Meeting has been held
- Site and No-Go areas has been identified **and demarcated**.
- Contractors are in possession of the EMPr and other relevant documentation
- Contractors/ Sub contractors have signed the Declaration of Understanding
- All mandatory site equipment is in place
- On-site Environmental Education and Awareness training session has taken place with all relevant construction personnel present.

NB: Work refers to: Camp Establishment, Earthmoving activities and any preliminary construction activities.

3.3 ISSUES OF CONCERN

Issues of concern that were identified in the Environmental Impact Assessment process and included in the EA or detailed in the Basic Assessment Report must be addressed during the "On Site Start-Up Meeting" and must be included in the On-Site Start-Up Report. Issues of Concern include but shall not be limited or restricted to the following:

- Site demarcation
- Demarcation and protection of any "no-go areas".
- Establishment of temporary laydown areas.
- Waste management and disposal.
- Mandatory site equipment.
- Establishment of construction site compound.
- Above ground bulk fuel storage facilities (if required);
- Ablution & Toilet Facilities.
- Refuse Management.
- Concrete works & batching plant facilities (if required)
- Soil erosion and sediment control.
- Firefighting equipment & emergency fire reaction plan.
- Rehabilitation

3.4 SITE SPECIFIC ARRANGEMENTS & CONSTRUCTION PROCEDURES

Please note that all recommendations summarised in the Draft Basic Assessment Report must be addressed and read as part of the site-specific arrangements & construction procedures which will include:

- General recommendations;
- Site specific mitigations;
- Conditions of approval of the Environmental Authorisation (if required).

3.4.1 ON-SITE START-UP MEETING

The mandatory **On-Site Start-Up Meeting** must be conducted at least **14 days but not less than five working days** prior to commencement of any site/camp establishment, earthworks and/or construction activities and will relate to additional discussed information that must be complied with during the entire construction phase.

On-Site Start-Up Meeting points of discussion are:

- The Construction EMPr & other relevant site documents
- Project to be discussed and all uncertainties are cleared
- Method statement/s to be discussed
- Road and construction area to be demarcated
- Materials stockpiles and lay down areas to be demarcated
- Method of stockpiling to be discussed
- Firefighting procedures
- Mandatory firefighting equipment & fire preventative measures
- Solid waste removal plans
- Placement, type and service of toilets to be agreed on
- Placement and type of refuse bins and removal of refuse to be agreed on
- Labour overnight camp to be demarcated and services if agreed to by ECO
- Environmental Education and awareness training session to all contractors & onsite staff.
- Location & establishment of concrete batching plant.

3.4.2 START-UP MEETING PARTICIPANTS

Minutes of the onsite Start-Up Meeting will be reduced to a report and circulated to all attendees of the above-named meeting for their perusal and comments. The On-site Start-up Meeting report will form part of this EMPr. If any discrepancies between the start-up report and the EMPr arise, the EMPr will take precedence until clarification on the discrepancy is clarified. If any discrepancies arise between the EMPr and the EA, the EA will take precedence until clarification on the discrepancy is clarified.

Participants to the start-up meeting should include:

- Applicants Representative.
- Main Contractor's Representative.
- Resident Engineer
- Site foreman.
- Environmental Consultant.
- ECO.

NB: It is the responsibility of the main contractors to ensure that all sub- contractors, that work on the site during and after the civil's contract, are informed of the environmental conditions pertaining to the site.

3.5 ENVIRONMENTAL- & AWARENESS TRAINING

3.5.1 ENVIRONMENTAL AWARENESS COURSE

Environmental awareness training courses shall be provided to all personnel on site. The ECO is responsible for the initial environmental awareness course which shall include all relevant management, the Construction Supervisor, the Contractor and all foremen. All attendees shall remain for the duration of the course.

The Contractor shall be responsible to ensure that all his personnel and subcontractors (if applicable) are informed and made aware of the environmental constraints and shall also supply the ECO with a monthly report indicating the number of employees used by him. If refresher courses are deemed necessary, for instance, where personnel disregard the requirements of the EMPr, the time lost and the cost of the course is for the account of the Contractor.

3.5.2 SPECIFIC TRAINING

All contractors and workers shall be informed of any special habitat, biodiversity feature, vegetation and/or rare plant species that might be present on the specific construction site (if applicable).

3.6 METHOD STATEMENTS

Method statements from the contractor will be required for specific sensitive actions on request of the authorities, the Applicant and/or ECO.

A method statement forms the base line information on which sensitive area work takes place and is a "live document" in that modifications are negotiated between the Contractor and ECO/applicant, as circumstances unfold.

All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP main document.

These documents must be available to the authorities for inspection or on request.

A method statement describes the scope of the intended work in a step-by-step manner in order for the ECO and Applicant to understand the contractor's intentions. This will enable them to assist in devising mitigation measures to minimise environmental impact during these the undertaking of tasks.

The Contractor must submit the method statement before any particular construction activity is due to start. Work must not commence until the ECO and applicant have approved the method statement.

Method statements need to be compiled by the contractor for approval by Applicant and the ECO. The contractor must submit written method statements to Applicant for the purposes of the environmental specification, a "Method Statement" is defined as a written submission by the contractor to Applicant setting out the plant, materials, labour and method the contractor proposes using to carry out an activity, in such detail that the Applicant and the ECO are able to assess whether the contractor's proposal is in accordance with the specifications and/ or will produce results in accordance with specifications.

The method statement must cover applicable details with regard to:

- Construction procedures
- Materials and equipment to be used
- Getting the equipment to and from site
- How the equipment/ material will be moved while on site
- How and where material will be stored
- Location & establishment of concrete batching plant facility.

- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material (of any potential hazardous material) that may occur
- Timing and location of activities
- Compliance/ non-compliance with the Specifications, and
- Any other information deemed necessary by the Applicant and the ECO

The Contractor must abide by these approved method statements, and any activity covered by a method statement must not commence until Applicant and the ECO has approved of such method Statement.

NB: No work may commence or take place before the Method Statement has been approved by all relevant parties.

List of possible Method statements include but shall not be limited or restricted to:

- Demarcation
- Demarcation and protection of "no-go areas".
- A traffic management plan for the site access road.
- A transportation plan for the transport of larger components.
- A storm water management plan.
- An erosion management plan.
- Clearing of vegetation and topsoil removal
- Clearing and disposing of alien vegetation
- Stockpiling
- Temporary storage facilities
- Construction camp and site offices
- Fuel storage
- Labourer's facilities
- Mandatory site equipment
- Waste control
- Cement mixing
- Construction vehicle maintenance
- Heavy earthmoving equipment
- Dust control
- Noise control
- Rehabilitation

3.6.1 ADDITIONAL METHOD STATEMENTS

Any additional method statements (with regards to a specific aspect of construction) that may be required must be **submitted** and approved before commencement of the specific works and must be available at the site offices.

3.7 NON-COMPLIANCE

Applicant (on recommendation by the ECO) reserves the right at all times for the duration of this agreement to impose restrictions and associate penalties on the contractor with respect to the specific nature, timing and extent of construction activities on environmentally sensitive sites.

3.7.1 CORRECTIVE ACTION INSTRUCTION

The ECO may issue an onsite corrective action instruction to the site agent, or, by means of an entry into the Site Instruction Register for remedial work to be carried out to rectify any non-compliance that has been carried out within a reasonable agreeable time frame to carry out and complete the remedial work.

3.7.2 WRITTEN WARNING

In instances of non-compliance with the EMP by the contractor (or any of their employees) or sub-contractor/s (or any of their employees) that move on or off the site, the onsite ECO must issue a written warning indicating the non-conformance to the contractor.

If repeated instructions by the ECO to the site agent to respond to the corrective action instruction have not been carried out the ECO can issue a Written Warning notation instructing the site agent to timeously carry out the corrective measures as per the original non-compliance.

3.7.3 PENALTY FINES

In the event of the site agent negligence to respond and correct the noted non-compliance the ECO may in collaboration with the relevant parties recommend that a Penalty Fine be imposed on the contractor.

- The applicant, in consultation with the ECO must determine the amount of the penalty applicable in accordance with the Penalties for Non-Compliance Schedule of Tariffs.
- Such penalty amount must be in writing and presented to the contractor within seven days of the written warning.
- Applicant may recover penalties by deducting the fine from the offending contractor.
- The contractor will be responsible for all costs incurred where emergency procedures are implemented to deal with accidents impacting on the environment as well as the rehabilitation of such damage in conjunction with the ECO and site engineer.
- In serious cases, at the discretion of Applicant and the Environmental Consultant/ECO, any multiple offences can be added together.

3.7.4 STOP WORKS

The ECO (after consultation with Environmental Consultant/Applicant/Engineer) may also stop the works or part thereof until the situation is resolved; no extension of time is claimable by the contractor.

These penalties do not preclude any prosecution under any law or regulation.

3.8 AMENDMENTS TO EMPR

Although care has been taken to address all known relevant environmental issues for the construction phase, it may become necessary to add or amend certain procedures or instructions to improve the efficiency of the Environmental Management Plan (EMP).

- Only those additions or amendments of this EMPr that will either improve environmental protection or can be proved not to have any negative effect to the immediate and surrounding environment will be considered.
- Changes or deviations have to be motivated in writing by means of a Method Statement and the same procedures for a standard Method Statement have to be followed.
- Any additions or amendments must be submitted by the ECO to the Competent Authority (if so requested and required) after the ECO has consulted with the Environmental Consultant and Applicant.
- No deviation from the contents of the EMP is allowed without the above-named prescribed procedures.

3.9 RECORD KEEPING

All records relating to the implementation of this Environmental Management Plan must be kept together, be readily retrievable and available for scrutiny by any relevant authority. Records include the following:

- Declarations of understanding;
- ECO Checklist, audits and/or diary;
- Method Statements
- Environmental incident reports
- Photographs (must be taken before, during and immediately after construction as a visual reference);
- The Environmental completion statement.

These records must be available for scrutiny by any relevant authorities.

3.10 STANDARD MANAGEMENT PROCEDURES

3.10.1 ACCESS AND HAUL ROUTES

The Contractor must control all access (vehicles and plant) to and from the construction site, including that of his suppliers so that they remain on the pre-approved designated routes. In addition such vehicles and plant must be so routed and operated as to minimise disruption to regular users of the routes.

- Where heavy duty vehicles and construction plant are required, both the type of vehicles/machinery and the area/s these are to access shall be specified in a Method Statement and/or Traffic Management Plan.
- Access routes/haul roads will utilise only existing roads or tracks, unless such routes are not available or new routes are to be constructed as part of the project, in which case a Method Statement must be submitted for the construction of any new access/ haul roads (including temporary routes).
- No new roads or tracks may be created except where such routes are specifically approved by the ECO, in the EA or in this EMP.
- Any new access roads/haul roads must be designed so as to minimise erosion and must run across slopes and not directly up-hill.
- All vehicles and access to the site must remain within demarcated access routes and working areas on site.
- All reasonable measures must be implemented to minimise impacts on road users.
- On roads on the site, the vehicles of the Contractor and his suppliers must not exceed 25 km/h.

- Any temporary access routes must be rehabilitated at the end of the contract to the satisfaction of the ECO.
- All vehicles used for transportation or construction purposes must be limited to the designated routes to avoid unnecessary compaction of topsoil or to prevent disturbance to animals and plants outside of construction areas.
- The access roads must be covered with gravel to minimize dust pollution and the gravel must be extracted from a permitted quarry.

If so required by the owner of the land the following may also apply with regard to access and vehicular movement on site:

- All Contractors, subcontractors and staff shall be identified by clothing with company logos and be in possession of valid SA identity documents.
- Deliveries, removals etc. to be completed during normal working hours (unless otherwise agreed upon by the Construction Supervisor.
- No personnel shall stay permanently on site, unless permission to stay on site provided as part of the construction contract.
- Access route diversions must be clearly demarcated by orange twine/danger tape on steel posts or temporary fencing.
- The Contractor shall at his cost document the existing condition of all access roads prior to commencement.
- Should any damage occur to the access road as a result of the upgrade activities, the road will be rehabilitated to its original state with all costs borne by the contractor.

3.10.2 APPROPRIATE USE OF MACHINERY

Contractor must at all times carefully consider what machinery is appropriate to the task while minimising the extent of environmental damage.

- The contractor must not operate any machinery including a fuel driven compressor outside the demarcated area.
- All vehicles and equipment must be routinely inspected for fuel and oil leaks and kept in good working order and serviced regularly. Leaking equipment must be repaired immediately or removed from the Site. When servicing equipment, drip trays must be used to collect the waste oil and other lubricants. Drip trays must also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). Drip trays will be kept free of water that will float the oil to overspill. All drip trays / bunds to attain a 110% capacity of the plant fuel / oil capacity.
- Where practical, all maintenance of plant and machinery on site must be performed in workshops. If it is necessary to do maintenance outside of a workshop area, the Contractor must obtain the approval of the Engineer and the ECO prior to commencing activities.
- Appropriate 4.5 kg (minimum requirement) dry powder SABS approved and service certified fire extinguisher must be a mandatory item on all vehicles working and moving on or off the construction site.
- The servicing, repairs and maintenance of all construction machinery must take place at the designated service and maintenance yard and not along the proposed new road construction route.

3.10.3 "NO-GO" AREAS

Specifications of the Environmental Authorisation (EA), the Environmental Management Plan (EMP) or the On Site Start-Up Meeting (OSSM) can require that certain areas are to be considered as "No go" areas as a result of their environmental significance or proximity to environmental significant features.

- Any and all areas identified in site sensitivity overlays as "no-go" areas are to be considered as such, and appropriately demarcated as such.
- All areas of natural vegetation and streams/rivers outside of the development footprint should be considered "no-go" areas.
- A Method Statement is to be submitted to the ECO by the Contractor, detailing the method of demarcation for protection of such conservation areas.
- No-Go areas are out of bounds to the Contractor and his staff, sub-contractors and their staff or suppliers and their staff or any other person involved in the project, without the written permission specified by the ECO.
- The Contractor must ensure that, insofar as he has the authority, no person, machinery, equipment or material enters the designated "No Go" areas at any time.
- All contractors must be made aware of the importance of these features and the consequences of non-compliance. All staff are to be made aware of the "no – go" areas in the induction and environmental awareness training.
- All private property/farms outside of the works area are considered "no-go" areas, unless permission has been received from the ECO and written permission has been received from the land owner.
- Natural vegetation outside of the development area will be considered no-go areas, unless for the purpose of alien vegetation clearing.
- All drainage lines and watercourses outside the development footprint will be regarded as "no-go" areas. A minimum 32m buffer must be placed around all watercourses

3.10.4 RESTRICTION OF WORKING AREAS

The approved layout plans will be used to establish the site demarcation (footprint). All relevant parties responsible for the day-to-day activities on the site will be present and made aware of the implication of the site demarcation. They include the:

- Environmental Consultant: EnviroAfrica
- Principle Agent
- Main Contractor: Project Site Manager
- Sub-contractor: Project contractor
- ECO: Environmental Control Officer

The proposed site will be demarcated prior to the commencement of any construction whatsoever, this includes site establishment, the moving of construction material or any other items onto the site, etc.

- The site will be demarcated with appropriate dropper poles. A single strand of orange baler twine is to be attached to the dropper poles to indicate boundaries and no-go areas for site personnel and vehicular movement. (Alternative fencing may be decided upon, dependent on site requirements). Other demarcation measures can be used if approved first by the ECO.
- The construction area stockpile areas and development footprint etc. must be demarcated and fenced off with dropper poles and orange baler twine approximately 1m high is considered adequate. The demarcation will be agreed on during the start-up meeting.
- All fencing and fence placement / positioning must be approved first by the ECO on site.
- Work areas and access routes must be clearly demarcated to minimise environmental impact.

- In the event that sensitive features are threatened by construction activities, temporary fencing off of these areas (for individual areas such as trees or rocks) or the construction area (when working in a mainly natural environment) is recommended.
- NB: Also note the requirements discussed under the following paragraphs: 3.10.5; 3.10.2; 3.10.8; 3.10.6; 3.10.7.
- The Contractor must maintain in good order all demarcation, fencing and barriers for the duration of construction activities, or as otherwise instructed.
- Demarcation may not be moved, re-located or altered or changed without the approval of the ECO.
- Any temporary fencing removed for the execution of any portion of the works is to be reinstated by the Contractor as soon as practicable.
- The Contractor at the end of the contract must remove all demarcation, fencing or barriers not forming part of the final works on Site.

3.10.5 PROTECTION OF NATURAL VEGETATION

Habitat fragmentation is usually defined as a landscape-scale process involving both habitat loss and the breaking apart of habitat. Habitat loss has large, consistently negative effects on biodiversity. Habitat fragmentation per se has much weaker effects on biodiversity, but could be just as negative. As such the construction activities must be aimed at minimising impact on any remaining natural features and natural corridors.

- All significant biodiversity features identified during the environmental assessment stage, must be identified as "No-Go" areas on the site plans and must be fenced off. Only alien vegetation clearing may take place within the natural areas outside the demarcated works area;
- Except to the extent necessary for the carrying out of the works, no natural indigenous flora may be removed, damaged or disturbed;
- Trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on Site;
- Where the use of herbicides, pesticides and other poisonous substances are to be used, the Contractor must submit a Method Statement;
- The Contractor may not deface, paint, damage or mark any natural features, if these should occur (e.g. trees, rock formations, buildings, etc.) situated in or around the Site for survey or other purposes unless agreed beforehand with the Engineer and the ECO. Any features affected by the Contractor in contravention of this clause must be restored/rehabilitated to the satisfaction of the Engineer and the ECO.
- All incidents of harm to any animal or natural vegetation (apart from the agreed upon areas) must be reported to the ECO.

3.10.6 PROTECTION OF FAUNA AND AVI-FAUNA

Trapping, poisoning and/or killing of animals and birds is strictly forbidden. No domestic pets or livestock are permitted on Site. Many slow-moving animals, local amphibian and other species follow instinctive movements along roadside corridors where they travel from place to place.

- Every effort must be implemented on a daily on-going basis by the contractor to ensure that the construction areas have been checked for any animals and to ensure their removal and protection from direct and in-direct impacts during the construction activities. Special cognisance of tortoises must be taken on site.
- Any open trenches must not be left open for extended periods of time. If trenches are to be left open for extended periods, these should be fenced/secured to prevent livestock and other animals from falling in.

- The removal of fauna from the site must be done in accordance with the requirements of the relevant Nature Conservation Ordinance regulating these activities.
- Environmental corridors and "No-Go" areas must be demarcated and protected.

3.10.7 CLEARING OF VEGETATION, STRIPPING AND CONSERVATION OF TOPSOIL

The contractor shall take all reasonable steps to minimise the impact of his activities on the environment. If natural vegetation has to be removed for construction purposes, the natural vegetation should be rescued, reused (e.g. stabilizing the area after construction or re-vegetating other impacted areas) in such a way that it enhances the remaining natural veld. By the same principle, topsoil (which contains the remaining natural seed store as well as possibly many bulb species) must be carefully removed and stored and used for rehabilitation or impacted areas in the immediate vicinity.

Vegetation clearing:

- A Method Statement must be submitted detailing the methods to be used for vegetation clearing.
- All cleared areas must be stabilised as soon as possible.
- Burning of cleared vegetation on site is prohibited.
- The burying of cleared vegetation or use as part of backfill or landscape shaping is prohibited unless written approval has been obtained from the ECO beforehand.
- Cleared indigenous vegetation may be used for mulch or slope stabilisation of the Site.
- Should bulk vegetation be removed from the development footprint area, tall vegetation shall first be removed through brush cutting and chipping of larger shrub material; this may be added to the topsoil material stockpiles as mulch.
- Unless otherwise agreed upon, only indigenous plant material shall be used for this purpose.

Topsoil removal

- Prior to any activities within the demarcated work areas, topsoil shall be removed to a depth of 300mm or deeper if specified by the Engineer in consultation with the ECO, and stockpiled in a designated area for use in rehabilitation of the site post construction. Only sufficient topsoil is to be stored for rehabilitation purposed.
- Topsoil from the top 15cm - 20cm should be removed and used for rehabilitation after construction on site or in the immediate vicinity of the site.
- Any area where the topsoil will be impacted by construction activities, including the site offices and storage areas, must have the topsoil stripped and removed and covered with herbaceous vegetation (other than alien species) and other fine organic matter and stockpiled for subsequent use in rehabilitation.
- Topsoil storage areas must be shaped to be convex and should not exceed 2m in height. The Contractor must ensure that the material does not blow or wash away. The use of a bund wall should be considered, if appropriate, for the storage of topsoil.
- The topsoil should be stored outside the 1:50 flood level within demarcated area.
- Topsoil must be kept separate from overburden and not be used for building or maintenance of access roads.
- Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction.
- In particular, topsoil must not be subjected to compaction greater than 1 500kg/m² and must not be pushed by a bulldozer for more than 50m. Trucks must not be driven over the stockpiles.
- Topsoil from different soil types must be stockpiled separately and put back in the on-site areas of origin. Specific attention should be given to the areas that may house rare and threatened species.

- Topsoil areas must be demarcated in order to ensure the safekeeping of topsoil and to separate different stockpile types.

3.10.8 EROSION AND SEDIMENT CONTROL

The Contractor must continuously take appropriate measures to prevent erosion resulting from his own construction activities and operations as well as stormwater control measures to the satisfaction of the ECO. During construction the Contractor must protect areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible.

In order to achieve erosion and sediment control, the following are applicable to all sites:

- No new development, without prior written authority approval is allowed on slopes steeper than 12% (CARA, Regulation 3). If applicable terraces will be made in accordance with agricultural regulations.
- Install erosion and sediment controls before work starts and maintain these features throughout the construction and operational phases (as applicable).
- Leave as much indigenous vegetation as possible.
- Install temporary fences to define "No Go" areas in those areas that are not to be disturbed.
- Divert run-off from upslope away from the site, but ensure that this does not cause downstream erosion. For example, dig drainage channels (catch drains sized to accommodate the upslope catchment).
- Install sediment controls downslope of the site to catch sediment (if applicable).
- Inspect and maintain erosion and sediment controls regularly.
- Limit vehicle movement to the site and control access points. Clearly mark such access points and inform all suppliers.
- Save and reuse topsoil during revegetation. Never store topsoil around trees as this may kill the trees. Spread the topsoil back when the work is finished and revegetate the site as soon as possible to control erosion. Remove the sediment and erosion controls only after revegetation was successfully implemented.
- Store all stockpiles and building materials behind sediment fences. Cover them with plastic to prevent erosion by wind.
- It is unlawful to discharge water into the natural environment if the quality thereof does not conform to the required health or water standards. Other measures as may be necessary must be taken to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas. Any potentially hazardous fluids / materials must be kept away from the rain to prevent them being washed into drainage lines. All such measures must be discussed with and approved by the ECO.
- Backfill all trenches as soon as infrastructure has been placed inside the trenches.
- As far as possible, work must be done during the dry season, low flow conditions.
- Downstream placement of sediment containing measures.
- Due diligence to limit sediments washing down the river.
- Vegetation of ramps and shoulders.

3.10.9 ALIEN INVASIVE MANAGEMENT PLAN

In accordance with Regulation 15 and 16 of the Conservation of Agricultural Resources Act, 1983 (Act no. 43 of 1983) (CARA) as amended, all listed alien invasive plant species must be managed on any land in SA. As such an alien invasive management plan may be required during construction and operation phases of the development proposal. If such a plan is required, it must include mitigation measures to reduce the invasion of alien species and ensure that the removal of alien species is undertaken. Wetlands and rivers are especially susceptible to many of species.

- In accordance with the CARA, all identified alien invasive plants encountered on the property and its immediate surroundings must be kept under control.
- All invasive alien plants must be cleared from the site.
- An invasive alien plant monitoring, eradication and control plan should be compiled to effectively remove all infestations on the property. This will allow for a degree of natural passive restoration of natural vegetation.
- All alien invasive species must be identified and removed from each site and its immediate surroundings. This is especially true for any remaining natural corridor on site.
- Any exotic trees currently growing in riparian zones on site should be cut and the stumps treated with herbicide to prevent re-growth;
- No vegetation may be buried or burned on site.
- Where the use of herbicides and other poisonous substances are to be used, the Contractor must submit a Method Statement.

The invader status of the various invasive alien species in South Africa is described in accordance with Regulation 15 and 16 of the Conservation of Agricultural Resources Act, 1983 (Act no. 43 of 1983) (CARA) as amended (the 3 categories and its control are summarised underneath).

Category 1 (Declared Weed)

- Prohibited on any land or water surface in South Africa
- Must be controlled or eradicated (except in biological control reserves).

Category 2 (Declared Invader – commercial value)

- Allowed only in demarcated areas under controlled conditions
- Outside of controlled areas invaders must be controlled or eradicated where possible
- Prohibited within 30m off the 1:50 year flood line of watercourses or wetlands unless authorization has been obtained

Category 3 (Plant Invaders – ornamental value)

- Allowed only in areas where they were already in existence with the promulgation of the regulations.
- Prohibited within 30m of the 1:50 year flood line of watercourses or wetlands unless authorization has been obtained.
- All reasonable steps must be taken to ensure that they do not spread.
- Propagative materials of these plants (e.g. seeds or cuttings) may no longer be planted, propagated, imported, bought, sold or traded in any way.

3.10.10 PROTECTION OF ARCHAEOLOGICAL & PALEONTOLOGICAL REMAINS

Archaeological remains are ancient man-made objects, structures, or ancient burials that have been preserved on the earth's surface, underground, or underwater and serve as the historical sources that make it possible to reconstruct the past history of human society, including mankind's prehistory. Palaeontology, on the other hand, is the study of prehistoric life. It includes the study of fossils to determine organisms' evolution and interactions with each other and their environments (their paleoecology). Palaeontology lays on the border between biology and geology, and shares with archaeology a border that is difficult to define.

- Basic archaeological remains include work tools, weapons, domestic utensils, clothing, and ornaments; settlements including campsites, fortified and unfortified settlements, and separate dwellings; ancient fortifications; the remains of ancient hydraulic structures; ancient agricultural fields; roads; mining pits and workshops; ancient burial grounds and various burial and religious structures (stelae, stone figurines, stone fish monoliths (vishaps), menhirs, cromlechs, dolmens, sanctuaries); drawings and inscriptions carved into individual stones and cliffs; and architectural monuments. Archaeological

remains also include ancient ships and their cargoes that sank in rivers and seas and settlements that came to be underwater as a result of shifts in the earth's crust

- Should any archaeological remains or palaeontological resources (including but not limited to fossil bones and fossil shells, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts and bone remains, structures and other built features, rock art and rock engravings) are discovered during construction they must immediately be reported to SAHRA and must not be disturbed further until the necessary approval has been obtained from SAHRA.
- Should any human remains/burial or archaeological material be disturbed, exposed or uncovered during construction, these should immediately be reported to the South African Heritage Resources Agency (021 462 4502). The ECO and ER are also to be informed. An archaeologist will be required to remove the remains at the expense of the developer
- Note that the Contractor may not, without a permit issued by the responsible heritage resource authority; destroy, damage, excavate, alter, deface or otherwise disturb any archaeological site or archaeological material. The latter is a criminal offence under the Heritage Resources Act.
- A Fossil Find Procedure must be implemented, should any fossil material be discovered during construction, this must be safeguarded (preferably *in situ*) and the Environmental Control Officer (ECO) should alert SAHRA so that appropriate mitigation (*e. g.* recording, sampling, or collection) can be taken by a professional palaeontologist.

3.10.11 STORAGE OF CONSTRUCTION MATERIAL AND STOCKPILING

The Contractor must provide a method statement (for approval by the ECO) of the construction activities which will indicate:

- the type and quantity of material to be stored;
- whether any oil contaminated/containing equipment will be stored;
- how (including what type of vehicles will be required) it will deliver the material on site at the necessary storage area; and
- whether there is any risk of spill or runoff of any building materials or chemicals and how this is to be mitigated.
- No material is to be stored or stockpiled within any riparian zones or areas of natural vegetation. Disturbed areas, such as the cultivated fields and soccer pitch area, should be used for stockpiling.

In addition:

- The Contractor must ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor must ensure that these delivery drivers are supervised during off-loading, by someone with an adequate understanding of the requirements of the Specifications.
- All lay down areas outside of the construction camp must be first be granted approval by the Engineer and the ECO and must be such that they will not cause a nuisance or environmental damage.
- All building materials are to be prepared at the batching plant, to enable the effects of cement and other substances, and the resulting effluent to be more easily managed.
- It is essential that any imported material i.e. base material for road works, building sand, bedding base sand for pipe / cable lines etc. must be screened and of which the origins must be identified prior to arriving at the receiving environment, this must be approved by the Engineer / ECO.
- Special care must be taken to prevent bringing in materials contaminated with the seeds of Invasive Alien Plants. Contractors must not import construction materials such as sand, gravel or fill contaminated with seed of Invasive Alien Plants, or quarried from areas surrounded by Invasive Alien plant species.
- The Contractor must ensure that all staff, contractors and subcontractors are aware of and keep material within these designated storage areas. The Construction Supervisor shall ensure that the consultant team is familiar with same.
- Contractors will not be allowed to store new construction material on top of natural vegetation.
- Stockpiling of gravel, cut, fill or any other material including spoil should only be allowed in degraded areas or areas within the development footprint.
- Any areas used for stockpiling and not subsequently built upon must be restored to at least the state they were in before stockpiling and it must be ensured that the erosion potential of these areas is not increased.
- The Contractor must ensure that the stockpiled materials do not blow or wash away or mix with each other. If the stockpiled material is in danger of being washed away or blown away, the Contractor must cover it with a suitable material, such as hessian, netting or plastic.
- Also refer to the traffic- and transportation management plans and their requirements.

3.10.12 OIL STORAGE AND MANAGEMENT

An important potential environmental impact is oil spills from any oil filled equipment and machinery that may occur during transportation, operation or storage. The following conditions shall apply:

- Vehicles must be checked for oil leaks prior to going on site
- Care should be taken to prevent any potential oil spillage during upgrading activities.

- Sufficient measures should be put in place to ensure that any potential oil spills are mitigated.
- An oil spill kit should be available on site at all times during the construction activities;
- Oil containment facilities should be provided for any oil filled equipment onsite;
- All oil spills must be reported to the ECO within 24 hours, indicating the containment and rehabilitation measures implemented.

3.10.13 STORING OF PETROLEUM PRODUCTS

Petroleum fuels contain harmful substances known to cause health problems and can easily have adverse effects on water quality, and the environment. Petroleum spills can move rapidly into the soil and quickly contaminate drinking water. In order to prevent pollution it is important to, use proper methods when handling, using, and storing diesel fuel, gasoline, kerosene, or other petroleum products.

The South African National Standards pertaining to the installation of a storage tank include:

- Sans 310, which requires that an aboveground storage tank be of sufficient structural strength, based on sound engineering practices, to withstand normal operations and use;
- Sans 1668, for fibre-reinforced plastic tanks for the underground storage of petroleum products;
- Sans 10089-1, which deals with the storage and distribution of petroleum products in aboveground bulk installations; and
- Sans 1535, for glass- reinforced polyester-coated steel tanks, for the underground storage of hydro-carbons and oxygenated solvents, which are intended to be buried horizontally.

Above ground fuel storage tanks (if required)

Any fuel storage proposals must be cleared by the ECO before any storage or stockpiling takes place. If the contractor proposes to install above-ground fuel storage tanks for use during the construction phase of the project, the following basic requirements must be adhered to:

- A Method Statement, explaining the method of storage and mitigation measures to prevent spillages must be submitted to the ECO and accepted prior to the installation of such a fuel storage facility (please note that storage of any dangerous goods/fuel of 30 cubic meters or more require environmental authorisation).
- The fuel tank must be placed within a completely sealed concrete bund (containment structure) which must be able to contain at least 110% of the total capacity of the fuel tank.
- The bunded area should be built to be at least a third wider (on all sides) than the base of the fuel tank in order to maximise its capability to contain spillages and leakages.
- The fuel distributor must also be located within a bunded area to better prevent accidental spillages during refuelling.
- In addition, drip trays are to be used during refuelling.
- All vehicles, equipment, fuel and petroleum services and containers must be maintained in a good condition that prevents leakage and possible contamination of soil or water supplies.
- Fuel storage areas must comply with general fire safety requirements.
- Fuel storage areas must be at least 100m from any watercourses.

Storing of smaller quantities of fuel or oil

Any fuel storage proposals must be cleared by the ECO before any storage or stockpiling takes place. If the contractor proposes to use only small fuel storage facilities (< 200 litres) the following basic requirements must be adhered to:

- Fuels and oils must be safely located out of harm's way from the elements and safety and fire prevention must be strictly adhered to.
- All fuel oil containers must be placed within suitable drip trays to prevent accidental spillage of oils and fuels.
- A suitable leak proof container for the storage of oiled equipment (filters, drip tray contents and oil changes etc.) must be established.
- All spills are to be recorded in the ECO diary.

3.10.14 STORAGE OF HAZARDOUS SUBSTANCES

If potentially hazardous substances are to be stored on site, the Contractor must submit a Method Statement detailing the substances and/or materials to be used, together with the storage, handling and disposal procedures of the materials to the ECO.

- Hazardous materials must be stored under lock and key in designated areas with properly displayed and visible warning signs.
- No works related to the submitted Method Statement may commence until the Method Statement has been studied and approved in writing.
- An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage must be implemented. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.
- Measures to protect hydrological features such as streams, wetlands drainage lines and their tributaries and their catchments, and other environmentally sensitive areas from construction impacts including the direct or indirect spillage of pollutants must be implemented.
- **Paints: -** No paint products must be disposed of on Site and brush/roller wash facilities must be established to the satisfaction of the Engineer and the ECO. Oil based paints and chemical additives and cleaners such as thinners and turpentine must be strictly controlled. A Method Statement detailing the paint management procedures is required.
- **Hazardous building materials: -**Hazardous building materials must be identified and dealt with in accordance with the relevant safety and health legislation. All such material must be separated on Site and disposed of at appropriate licensed disposal sites. The Contractor must supply the ECO with a certificate of disposal.

3.10.15 USE OF CEMENT OR CONCRETE

The Contractor is advised that cement and concrete are highly hazardous to the natural environment because of the high pH levels of the material, and the chemicals contained therein. Wash-out water with high pH is the number one environmental issue for the ready-mix concrete industry. The alkalinity levels of wash water can be as high as pH 12, which is toxic to fish and other aquatic life.

The Site Supervisor or Contractor must indicate the need for and the proposed location of concrete batching plants which includes the location of cement stores, sand and aggregate stockpile areas. A Method Statement indicating the layout, type of concrete batching preparation (dry or wet mix). The site agent must indicate on the Method Statement proposed total volume of concrete that is needed for the completion of the entire project.

Concrete/cement mixing:

- Concrete and cement must only be mixed on existing hard surfaced areas, or edged mortar boards or a suitable container. Concrete may not be mixed or stored directly on the ground under any circumstances.

- The visible remains of the batch and concrete, either solid, or from washings, must be physically removed immediately and disposed of as hazardous waste.
- Washing of equipment shall be done in a container to prevent any runoff of contaminated washing water.
- Extreme care must be taken to limit the amount of water contaminated by washing equipment. Water from concrete washing can be re-used in concrete mixes or must be stored in drums, then removed from the site and disposed of at a licensed municipal dump site.

Concrete batching plants (if required)

The following procedures must be implemented to control wastewater run-off from concrete batching plant locations:

- The location of concrete batching areas must be approved beforehand by the ECO (if possible/appropriate, the use of ready-mix concrete is preferred).
- Concrete batching facilities must have suitable bunding methods in place to ensure minimal wastewater is released during batching operations.
- Contaminated water must not enter a natural or man-made (e.g. trench / sloot or dam) water system. Preventative measures include establishing sumps from where contaminated water can be either treated in situ or removed to an appropriate waste site.
- Dry mixing batching areas to be carefully placed in consultation with the ECO.
- Cement bags are to be stored securely out of harm's way from the elements (wind and rain). Bags have to be covered and placed on plastic sheeting. Used cement bags must be disposed of on a regular basis via the solid waste management system, and must not be used for any other purpose.
- Sand and stone used for cement or concrete batching must be stored on plastic layers (or on ECO approved disturbed areas) in order to prevent contamination of the natural environment.
- Cleaning of equipment and flushing of mixers must not result in pollution of the surrounding environment. All wastewater resulting from batching of concrete must be disposed of *via* the contaminated water management procedure.
- Excess or spilled concrete must be confined within the works area and all visible remains of excess concrete must be physically removed and disposed of on completion of cement work. Washing the remains into the ground is not acceptable. All excess aggregate must also be removed.
- Wash-down areas must be confined to within the concrete batching areas only.

3.10.16 FIRE FIGHTING

Adequate fire-fighting equipment according to the fire hazard during the construction period must be available on site and in good working order (at least one type ABC (all purpose) minimum 4.5 kg extinguisher and 3 fire beaters per working area). The persons on site must be trained in the use of such equipment.

- The main contractor must provide a list of all authorities involved in firefighting in the region. This list must include emergency contact numbers and must be visible at the site office.
- Welding, gas cutting or cutting of metal will only be permitted inside the working areas.
- The Contractor must pay the costs incurred to organizations called to put out any fires started by him. The Contractor must also pay any costs incurred to reinstate burnt areas as deemed necessary by the landowner.
- It is required that contractors have available the emergency telephone numbers of the nearest local Fire Fighting Station and that an emergency firefighting re-action plan has been drawn up with on-site workers and the resident land-owner / farmer.
- No on-site fires are permitted.
- No firewood may be collected on site or from the surrounding natural area.

3.10.17 EMERGENCY PROCEDURES

It is the responsibility of the contractor to assess the potential risks to the environment as a result of the project. As such, the contractor must have the necessary standard emergency operating procedures in place to deal with any potential emergency such as oil spills or fire.

- All staff should be made aware of the necessary basic emergency procedures in the event of an emergency including injuries to staff. The appropriate equipment and identified personnel to deal with such basic emergencies should be available on site.
- All staff on site should wear hi-viz vests when on site.
- **Fire:** The Contractor must advise the relevant authority of a fire as soon as one starts and must not wait until he can no longer control it. The Contractor must ensure that his employees are aware of the procedure to be followed in the event of a fire.
- **Hazardous Material Spills**: The Contractor must ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which must include notifying the Engineer, the ECO and the relevant authorities. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the ECO and Local Authority.

3.10.18 SOLID WASTE MANAGEMENT

Waste refers to all solid waste, including domestic waste, hazardous waste and construction debris. The Contractor is responsible for the establishment of a refuse control system (which must consider recycling wherever possible) that is acceptable to the ECO. Disposal arrangements must be made in advance and cleared with the ECO before construction starts.

- No littering or on-site burying or dumping of any waste materials, vegetation, litter or refuse may occur.
- All solid waste must be disposed of offsite at an approved landfill site in terms of section 20 of the Environment Conservation Act (Act No. 73 of 1989). The Contractor must supply the ECO with a certificate of disposal.
- The Contractor must provide problem animal- and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must be kept firmly on the bins at all times. Bins must not be allowed to become overfull and must be emptied regularly.
- Waste from bins may be temporarily stored on Site in a central waste area that is weatherproof and scavenger proof and which the Engineer and the ECO has approved.
- All hazardous waste must be disposed of at a registered hazardous waste disposal site and certificates of safe disposal must be obtained.
- All waste generated during the decommissioning and reconstruction activities must be removed by the Contractor as soon as possible, and within the period specified in the EMP and disposed of at a registered landfill site.
- The Contractor must make provision for workers to clean up the Contractor's camp and working areas on a daily basis so that no litter is left lying around and so that the site is in a neat and tidy state. The Contractor must remove from site the refuse collected at least once a week.
- Waste and any excess material (and concrete slabs and pipes) should not be dumped into any riparian zones.

3.10.19 TOILETS AND ABLUTION FACILITIES

The Contractor must provide suitable sanitary arrangements at designated points of the construction site for all site employees. A minimum of one toilet must be provided per 15 persons at each working area (station) or as stipulated in the Management plan.

- The toilet must be within easy reach (max 300m) of the working area and be in good working condition and cleaned on a daily basis. Toilet paper must be provided. The toilets must be emptied on a weekly basis or when full or when instructed by the ECO on site.
- Toilets should be placed at least 50m from any watercourses.
- Toilets should be adequately screened from any public areas or residences.
- Disposal arrangements must be made in advance and cleared with the ECO before construction starts. Sanitation provision and servicing must be to the satisfaction of the ECO.
- The Contractor must ensure that toilets are emptied prior to any builders' holidays, and/or weekends.
- Toilets must be of a neat construction and must be provided with doors and locks and must be secured to prevent them blowing over.
- NB: No burying of any waste material on or near the construction site nor anywhere on the surrounding property is permitted.
- Eating areas that are allocated for workers must be established in an environmentally acceptable manner and in line with all OH&Safety Act regulations. All on site and on route workers temporary eating areas must have acceptable toilet and refuse management systems in place and these areas must have suitable refuse receptacles' available for the containment and disposal of general litter and refuse.

3.10.20 DISCHARGE OF CONSTRUCTION WATER

Potential pollutants of any kind and in any form must be kept, stored, and used in such a manner that any escape can be contained and the water table not endangered. This particularly applies to water emanating from runoff from construction areas/fuel depots/workshops/truck washing areas.

- The contractor, being responsible for the construction and effective containment and maintenance of settlement ponds must ensure that the surrounding environment is not adversely affected as a result of construction activities.
- Wash down areas must be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. Contaminated water includes water that is carrying excess sediment due to construction activities.
- Contaminated water storage facilities must not be allowed to overflow and appropriate protection from rain and flooding must be implemented.
- Contaminated water that is removed from site must be disposed of at a facility approved by the ECO and Local Authority.
- No contaminated water that does not meet the water quality standards and criteria under the National Water Act may be released into a natural system, whether it is to surface or groundwater.
- All cement effluent from mixer washings, and run-off from batching areas and other work areas must be contained in suitable sedimentation ponds.
- Sedimentation ponds must be allowed to dry out on a regular basis to allow for solid material to be removed.
- This material must be disposed of in a suitable manner, depending on the nature of the material, and to the discretion of the ECO

3.10.21 EATING FACILITIES

The Contractor must designate eating areas for the approval of the ECO, which must be clearly demarcated. No eating of meals must take place outside these designated areas without the approval of the Contractor/ESO.

- The feeding, or leaving of food for animals are strictly prohibited.
- Sufficient waste bins must be present in this area and emptied regularly.

- The contractor must supply cooking facilities that are suitable for the environment and are not liable to cause the outbreak of fires.
- The contractor must supply all construction staff with adequate clean water, and may not be sourced from surrounding farms/ landowners, unless written permission is granted by the landowner.
- No overnight camping/stay on site allowed. If overnighting is necessary for security purposes then it must be cleared with the ECO on site.
- No washing in dams or streams are allowed.

3.10.22 DUST CONTROL

The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities resulting from along-construction-route activities (but must also take into account possible water constrictions of the area).

- The onsite construction site agent must take into account prevailing wind strength and wind direction and must have preventative measures on standby to minimize dust pollution that may cause damage to people and property.
- The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
- In agricultural areas, earth-works should be done after the harvest season, or as agreed upon by the land-owner.

3.10.23 RESTORATION AND REHABILITATION

The Contractor must ensure that all structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed. On completion of the project or phase, all areas impacted by the construction activities must be reinstated and/or rehabilitated to the satisfaction of the ECO with emphasis on the following:

- Immediately after the demolition of the camp site or once construction has been completed, the contractor shall restore the site to its original state, paying particular attention to its appearance relative to the general landscape. This must be done as soon as possible after construction has ended to ensure no possible environmental degradation of the site as a result of erosion, alien vegetation establishment etc.
- The contractor's procedure for rehabilitation shall be approved by the ECO and Engineer.
- Site offices must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO.
- Labourer's facilities (if applicable) must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO.
- All construction site areas must be rehabilitated or reinstated to the satisfaction of the ECO.
- All temporary fencing and demarcation must be removed and the areas reinstated to the satisfaction of the ECO.
- Temporary storage areas must be rehabilitated or reinstated to the satisfaction of the ECO.
- All remaining construction material must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO.
- Any old road sections not used for operational purposes during the operational phase should be rehabilitated after construction to allow for regrowth of vegetation.

Any additional **disturbed** areas must be rehabilitated or reinstated to the satisfaction of the ECO. This shall include but not be limited to:

- Earthworks to reinstate the physical characteristics of the site. Here attention to the natural vertical and lateral heterogeneity in landform shall guide the reinstatement of natural areas.
- Replacement of topsoil material – care shall be taken to ensure that the same material that was removed from each area is replaced there, since this will carry the seed complement appropriate for re-establishment of each plant community type.
- Final landscaping by machine, but landscaping by hand may be required in many areas under rehabilitation.
- Re-seeding and / or replanting of rehabilitated areas.
- The Contractor shall not be permitted to use fertilisers or pesticides.
- It is imperative that any potential erosion problems are addressed. This may require subsequent site visits to monitor the efficacy of erosion control measures.

3.10.24 LAND MANAGEMENT

- Vehicle movements should be kept to a minimum during rain to avoid damage to access roads.
- No fences or gates on the proposed site must be damaged. All access gates to the property (construction site) to be kept closed at all times to prevent domestic and or wild animals from getting out. Access by unauthorised personnel should be controlled. The access gates to the construction areas must always be closed.
- Soil erosion must be prevented at all times along the access roads and around the proposed site.

3.10.25 SOCIO-CULTURAL ISSUES

- Neighbouring community, adjacent land owners and occupiers etc. must be treated with respect and courtesy at all times.
- The cultural lifestyles of the community living in close proximity to the proposed site must be respected.
- Hours of work on the site shall be limited to normal working hours as accepted by the local authority.
- Should construction be required outside of these times, permission must first be obtained from the local municipality, in consultation with the ECO and the surrounding landowners.

3.11 EMERGENCY PREPAREDNESS & RESPONSE

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

3.11.1 ACCIDENTAL FIRES

Fire safety is a very real risk and must be stringently controlled. No fires will be permitted on site for any reason. If required, a designated smoking area will be provided, and clearly demarcated and signposted, with a facility for safe containment and disposal of cigarette butts.

The following measures must be implemented:

- Adequate fire fighting equipment must be available on site and in good working order (including at least one type ABC (all purpose) minimum 4.5 kg fire extinguisher and 3 fire beaters per working area). The persons on site must be trained in the use of such equipment.

- The main contractor must provide a list of all authorities involved in fire fighting in the region. This list must include emergency contact numbers and must be visible at the site office.
- The contractors must establish an emergency procedure (with contact numbers) to the satisfaction of ECO (whenever work is done in any fire prone areas).

3.11.2 HYDROCARBON SPILLS

Since the development proposal is relatively small, on-site fuel storage or distribution facilities are not likely to be established. As a result the significance of any spill is much reduced. The following must be observed:

- Vehicles will arrive on site already fuelled for the project.
- If additional fuel is needed, it will be brought in as needed (minimal volumes) and refuelling will be done using a pump and not a funnel (to minimize the risk of spills).
- Spill trays shall be used during re-fuelling.
- In the case of accidental spillages or leakage, the contractor will be responsible for immediate containment and corrective action (*e.g.*, stopping the leakage), and to inform the Construction Supervisor and ECO.
- The ECO will recommend the best possible environmental solution.
- The Contractor will be liable for any costs incurred.

3.11.3 CONCRETE/ CEMENT SPILLAGES

The Contractor/supplier will be liable for the safe and correct delivery of substantial loads of concrete or cement.

- Should a spill occur the Contractor/supplier will be liable for all costs of the rehabilitation needed.

4. OPERATIONAL EMPR (OEMPR)

The most important part of the operational phase will be to ensure that the site is meticulously maintained and that the operations are carefully monitored. The Swartland Municipality will remain overall responsible for the environmental performance of the site and must be aware of the legal requirements and obligations. The applicant must also be aware of the legal action that can be taken against **him as a person** with regards to negligence leading to environmental pollution.

The owner or delegated responsible person must implement an operational and maintenance management plan for the development. This plan must include:

Access management and control
Water management and monitoring.
Erosion management
Waste and pollution management.
Fire Management
Minimise dust and air emissions.
Protection of indigenous natural vegetation and fauna
Alien vegetation removal
Specific monitoring and operational instructions.
Emergency plans which will cover all reasonable aspects of the operations which might lead to environmental pollution or degradation.

4.1 TRAFFIC ACCESS ROUTES AND HAUL ROADS

The Operator of the site must control the movement of all vehicles and plant including to and from the proposed site so that the vehicles and plant remain on designated routes.

- Only approved access roads must be used.

4.2 EROSION AND SEDIMENT CONTROL

Soil erosion by wind and water removes valuable topsoil which is the most productive part of the soil profile (containing plant nutrients, seeds and bulbs). Development disturbs and loosens soils and this can easily lead to erosion. The plants and animals that depended on that soil can no longer thrive, and the plants that once grew there struggle to re-establish themselves because the seed store is gone. Soil may then have to brought in from elsewhere, increasing the cost of the project and the risk of importing weeds and other waste or toxic material. In accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA), the aim of erosion management is to prevent any form of soil erosion through proactive thinking and prevention as well as immediate rehabilitation.

In order to achieve erosion and sediment control, the following are applicable to all properties:

- Inspect and maintain erosion and sediment controls on a regular basis and ensure that these can accommodate the upslope catchment.
- Leave as much vegetation as possible.
- Erect fences to define 'no go' areas in those areas that are not to be disturbed.
- Install sediment catchment controls down slope of the site to catch sediment (if applicable). This must be done as soon as possible by the Applicant and should be permanent.
- Driving off road, or over the edge of the road to avoid puddles, or obstacles, should be avoided. Obstacles should be removed to avoid vehicles from having to drive off the road surface.
- The road surface must be maintained.

- Maintain stormwater management infrastructure.
- Due diligence to limit sediments washing down the river.

4.3 WATER-RELATED IMPACTS MANAGEMENT

The protection of drainage lines and their tributaries and other watercourses from the development proposal remains paramount also in the operational phase, as the Northern Cape is a water scarce province. The following impact minimisation and mitigation measures must therefore be implemented:

- The land immediately bordering the proposed WWTW should be levelled and landscaped after construction work ends, so as to reduce the likelihood of sand, mud and silt being washed away down the on-site drainage line.
- Daily visual inspection of the WWTW must be conducted for any signs of leakage such as proliferation of wetland vegetation and any leakage discovered must urgently be sealed.
- The intersections of the pipelines with the on-site drainage lines must be landscaped following construction to help prevent erosion or pooling when it rains. These crossings must be monitored regularly so that they can be repaired soon if any signs appear of erosion or flood damage
- Monitor quality of treated wastewater and make required adjustments to operations accordingly.
- Make public, the results of the tests conducted on the treated wastewater discharged by the WWTW
- Groundwater quality must be monitored at downstream boreholes and any adjustments that appear necessary at the WWTW for improving the groundwater quality must be made. In addition, the results of the groundwater quality monitoring must be made public.
- Keep the site free of litter

4.4 SLUDGE MANAGEMENT

- The depth of sludge in the oxidation ponds must be measured annually and the sludge sampled and subjected to laboratory tests. It is anticipated that every seven years, the sludge will have accumulated to more than 50% of the capacity of the oxidation ponds and so the sludge will be extracted and disposed of.
- If the results of laboratory testing indicate that the sludge is suitable for usage as fertiliser, the sludge may be dried and then supplied to farmers for usage as fertiliser. However, should laboratory testing indicate that the sludge is unsuitable for usage as fertiliser, the sludge must be disposed of at a suitably licenced waste disposal site determined together with the National Department of Water and Sanitation and the required chain of custody records of disposal must be kept and produced upon request to the relevant officials.

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4.5 TERRESTRIAL BIODIVERSITY IMPACTS MANAGEMENT

The objectives regarding the management of natural areas are to identify critical or conservation-worthy features and to manage such areas and gardens in such a manner as to promote biodiversity and ecological processes.

- All efforts should be made to protect all mature indigenous trees (*e.g.*, *Pappea capensis* individuals). o Northern Cape Nature Conservation Act permit must be obtained for the potential impacts on the NCNCA protected species.

- A NEM:BA permit must be obtained, should any of the *Hoodia gordonii* individuals have to be re-planted.
- All alien invasive species within the footprint and its immediate surroundings must be removed responsibly. Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g., spreading of these species due to incorrect eradication methods);
- Care must be taken to dispose of alien plant material responsibly.

4.6 EMERGENCY PREPAREDNESS AND RESPONSE

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

4.6.1 ACCIDENTAL FIRES

The following measures must be implemented:

- Adequate firefighting equipment must be available at an area where works or maintenance is taking place and in good working order (including at least one type ABC (all purpose) minimum 4.5kg fire extinguisher and 3 fire beaters per working area). The persons on site must be trained in the use of such equipment.
- The owner must provide a list of all authorities involved in firefighting in the region, including neighbouring landowners. This list must include emergency contact numbers and must be visible at the office.
- The owner must establish an emergency procedure (with contact numbers).
- Accidental fires are to be dealt with in terms of the local fire protection association or local regulations.

4.7 CHEMICALS MANAGEMENT

Proper chemicals management is required to minimise the risk of environmental damage, as well as the risk of fatalities, illnesses, injuries and incidents arising from the storage, handling, transport and disposal of hazardous material.

- Compliance with the Occupational Health and Safety Act of 1983
- An emergency plan must be made to comply with section 30 (Control of emergency incidents) of the National Environmental Management Act (NEMA), No. 107 of 1997.
- In case of a spill or leak of product, such incident must be reported to all relevant authorities and the Directorate: Pollution Management in accordance with Section 30 (10) of NEMA, No. 107 of 1997.
- All staff on the site must be well trained and have the appropriate PPE in all aspects of the Occupational Health and Safety procedures.
- Access to chemical storage areas must be strictly restricted authorised personnel.
- Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- A system shall be in place to ensure that MSDS are available to all personnel (including first aiders and medical personnel) involved in the transportation, storage, handling, use and disposal of hazardous materials on site.
- Labelling shall be in place on all storage vessels, containers and tanks, where significant risks exist (based on a risk assessment). Labelling shall clearly identify the stored material.

- Personnel using and handling chemicals shall have received proper training for this purpose, using information available from the MSDS.
- For each site establishment, yard or other temporary chemicals storage area, a map indicating the potential sources of pollution and corresponding location of spill kits will be prepared. Spill kits will be placed at sufficient proximity in accordance with the degree of risk for spillage, and a responsible person designated for each.
- Emergency response equipment for spillage containment, fires, explosions, burns, first aid, etc. must be made available.
- Visible safety signs must be placed in areas of potential hazard, e.g. where tap water is not to be used for drinking purposes, indicating the dangers of chlorine or informing of the safety equipment to be worn when entering a certain area, etc.

5. ENVIRONMENTAL AUDIT PROGRAMME

A Final Construction Phase Audit Report is to be undertaken six months post construction. This must be undertaken by a qualified Independent Environmental Auditor, and is to be submitted to the Competent Authority.

Since the development includes an operational phase, annual audits for the initial two years is recommended.

In terms of the 2014 EIA Regulations, Audit Reports must be submitted to the registered Interested & Affected Parties within 7 days of submission to the competent authority.

6. IMPACT MANAGEMENT OUTCOMES

Impact Management Outcomes

Planning, Design and Pre-Construction					
Impact	**Management Outcomes**	**Management Actions**	**Responsible Person/Party**	**Implementation Monitoring Method**	**Monitoring Frequency**
Demarcation of work areas	Prevent impacts on "no-go areas", including undisturbed areas, drainage lines and/or natural vegetation	• The site will be demarcated with appropriate dropper poles. Alternative fencing may be decided upon dependent on site requirements). Other demarcation measures can be used if approved by the ECO. • Work areas and access routes must be clearly demarcated to minimise environmental impact.	Contractor	Method Statement	Once-off
Demarcation of no-go areas	Prevent impacts on sensitive features on site, seasonal streams and natural vegetation on or adjacent to the site	• No-Go areas will be demarcated and indicated on a site plan. • Natural vegetation outside of the development area will be considered no-go areas, unless for the purpose of alien vegetation clearing.	Contractor	Method Statement	Once-off
Site camp establishment and access roads	Prevent unnecessary impacts on natural vegetation through the establishment and operations of the site camp and access roads.	The site camp, lay down areas, and access roads must be clearly defined on a plan, taking no-go areas into consideration, as well as proximity to water resources.	Contractor	Method Statement	Once-off

Fuel Storage	Prevention of fuel spillages and contamination of the soil and/or water resources	• The fuel tank must be placed within a completely sealed concrete bund. • All fuel oil containers must be placed within suitable drip trays to prevent accidental spillage of oils and fuels. • A suitable leak proof container for the storage of oiled equipment (filters, drip tray contents and oil changes etc.) must be established. • Fuel storage areas must be at least 100m from any watercourses.	Contractor	Method Statement	Once-off
Mandatory site equipment	Ensure the correct equipment is on site to meet environmental requirements as per the EMP	• Adequate fire fighting equipment must be available on site and in good working order (including at least one type ABC (all purpose) minimum 4.5 kg fire extinguisher and 3 fire beaters per working area. • Drip trays to be used during refuelling or storage of small quantities of fuel on site. • Adequate toilet and ablution facilities must be provided on site. Toilets should be placed at least 50m from any watercourses. Toilets are to be serviced and cleaned on a regular basis. • Adequate waste bins to be provided on site	Contractor	Method Statement	Once-off
Waste Management	To prevent and minimise waste generation and contamination of the site and surrounding areas	• No littering or on-site burying or dumping of any waste materials, vegetation, litter or refuse may occur. • All solid waste, except for the organic waste from the removed vineyards and natural vegetation, must be disposed of offsite at an approved landfill site in terms of section 20 of the Environment Conservation Act (Act No. 73 of 1989). The Contractor must supply the ECO with a certificate of disposal. • The Contractor must provide problem animal- and weatherproof bins with lids of sufficient	Contractor	Method Statement	Once-off

		number and capacity to store the solid waste produced on a daily basis. The lids must be kept firmly on the bins at all times. Bins must not be allowed to become overfull and must be emptied regularly.			
Fire Management	Prevent unnecessary fires which may cause damage and risk to the environment, property and human health, and adequately deal with any fires that may occur on site	• Adequate fire fighting equipment according to the fire hazard during the construction period must be available on site and in good working order (at least one type ABC (all purpose) minimum 4.5kg extinguisher and 3 fire beaters per working area). The persons on site must be trained in the use of such equipment. • The main contractor must provide a list of all authorities involved in fire fighting in the region. This list must include emergency contact numbers and must be visible at the site office. • No on site fires are permitted.	Contractor	Method Statement	Once-off

Construction					
Impact	**Management Outcomes**	**Management Actions**	**Responsible Person/Party**	**Implementation Monitoring Method**	**Monitoring Frequency**
Topsoil removal	Topsoil to be removed (if necessary), protected and stockpiled for rehabilitation after construction	• Prior to any activities within the demarcated work areas, topsoil material shall be removed to a depth of 300mm or deeper if specified by the engineer in consultation with the ECO, and stockpiled in a designated area for use in rehabilitation of the site post construction. • Topsoil from the still relatively natural area (the top 15 -20 cm) should be removed and be used for rehabilitation after construction on site or in the immediate vicinity of the site.	Contractor	Method Statement	Once-off
Stockpile Management	Avoid impacts on natural areas and watercourses from stockpiling of material, waste etc.	• Topsoil stockpiles to be separated from waste, building material etc. stockpiles. • Stockpile areas to be demarcated prior to construction.	Contractor	Method Statement	Once-off
Erosion Management	Prevent erosion as a result of construction activities on site	• Install erosion and sediment controls before work starts and maintain these features throughout the construction and operational phases. • Leave as much vegetation as possible. • Implement the Stormwater Management Plan. Adherence to the EMP & Implemention of Standard Management Procedures in terms of erosion and sedimentation.	Contractor	Method Statement	Continually during construction
Cement mixing	Prevent contamination from cement mixing and cement waste water on	• Concrete and cement may only be mixed on existing hard surfaced areas, or edged mortar boards or a suitable container.	Contractor	Method Statement	Continually during construction

	the natural environment, particularly water resources. Due to the high alkaline pH of cement, it is highly hazardous to the natural environment	• The visible remains of the batch and concrete, either solid, or from washings, must be physically removed immediately and disposed of as hazardous waste. • Washing of equipment shall be done in a container to prevent any runoff of contaminated washing water. • Extreme care must be taken to limit the amount of water contaminated by washing equipment. Water from concrete washing can be re-used in concrete mixes or must be stored in drums, then removed from the site and disposed of at a licensed municipal dump site. • Concrete batching facilities must have suitable bunding methods in place to ensure minimal waste water run-off occurs during batching operations. • Cleaning of equipment and flushing of mixers must not result in pollution of the surrounding environment. All wastewater resulting from batching of concrete must be disposed of *via* the contaminated water management procedure.			
Dust Control	Prevent and minimise dust generation on site which can become a nuisance to neighbouring land owners and residents, as well as being a health risk	• The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities resulting from along-construction-route activities (but must also take into account possible water constrictions of the area). • The onsite construction site agent must take into account prevailing wind strength and wind direction and must have preventative measures on standby to minimize dust pollution that may cause damage to people and property. • The liberation of dust into the surrounding environment shall be effectively controlled by	Contractor	Method Statement	Continually during construction

		the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.			

Rehabilitation					
Impact	**Management Outcomes**	**Management Actions**	**Responsible Person/Party**	**Monitoring Method**	**Monitoring Frequency**
Rehabilitation of the Construction site	Rehabilitation of areas impacted by construction activities	• All structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed. On completion of the project or phase, all areas impacted by the construction activities must be reinstated and/or rehabilitated to the satisfaction of the ECO. • Immediately after the demolition of the camp site or once construction has been completed, the contractor shall restore the site to its original state, paying particular attention to its appearance relative to the general landscape. This must be done as soon as possible after construction has ended to ensure no possible environmental degradation of the site as a result of erosion, alien vegetation establishment etc. • The contractor's procedure for rehabilitation shall be approved by the ECO and Engineer. • Site offices must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO. • Earthworks to reinstate the physical characteristics of the site. Here attention to the natural vertical and lateral heterogeneity in landform shall guide the reinstatement of natural areas. • Replacement of topsoil material – care shall be taken to ensure that the same material that was removed from each area is replaced there, since this will carry the seed complement	Contractor	Method Statement	Once-off

		appropriate for re-establishment of each plant community type. • Final landscaping by machine, but landscaping by hand may be required in many areas under rehabilitation.			

Operation					
Impact	**Management Outcomes**	**Management Actions**	**Responsible Person/Party**	**Monitoring Method**	**Monitoring Frequency**
Erosion Management	Avoid valuable topsoil removal	• Inspect and maintain erosion and sediment controls on a regular basis and ensure that it can accommodate the upslope catchment. • Leave as much vegetation as possible. • Install permanent fences to define 'no go' areas in those areas that are not to be disturbed. • Install sediment catchment controls down slope of the site to catch sediment (if applicable). This must be done as soon as possible by the Applicant and should be permanent. • Avoid driving off road, or off the road surface, to avoid puddles or obstacles. • During the operational phase of these gravel roads, prone to erosion exacerbated by heavy rainfall, running water must be deviated from the roads with appropriate storm water management infrastructure. Next to the road shoulders, paved swales will probably be necessary to prevent running storm water to erode deep trenches.	Owner	Visual monitoring	Weekly/after major rain events
Waste and Pollution Management	Avoid contamination of soil and water resources with pollutants.	• No on-site burying or dumping of any waste materials, vegetation, litter or refuse may be allowed. • Organic waste can be disposed of, buried on-site or used as mulch. • Domestic waste must be stored in approved containers (e.g. bins with removable lids).	Owner	Visual monitoring	Daily - Weekly

		• All solid waste will be disposed of at a landfill licensed in terms of section 20 of the Environment Conservation Act (Act No. 73 of 1989). • No material should be disposed into any riparian zone, including organic waste. • All possible pollution sources must be identified and all reasonable steps taken to prevent pollution or accidental spillages.			
Emergency Preparedness - Fire	Prevent unnecessary fires which may cause damage and risk to the environment, property and human health, and adequately deal with any fires that may occur on site	• Adequate fire fighting equipment must be available on site and in good working order (including at least one type ABC (all purpose) minimum 4.5 kg fire extinguisher and 3 fire beaters per working area). The persons on site must be trained in the use of such equipment. • The owner must provide a list of all authorities involved in fire fighting in the region, including neighbouring land-owners. This list must include emergency contact numbers and must be visible at the office. • The owner must establish an emergency procedure (with contact numbers). • The project facility must register with the local Fire Fighters Organisation and periodically conduct drills in conjunction with the local fire fighters unit. Fire management and Protection plan should be developed to implement measures that minimise the potential for human cause fires.	Owner	Visual monitoring	Daily- weekly / when required
Battery Energy Storage Systems (BESS)	Prevent contamination of soil or water resources through	• The battery storage system must be designed by professionals and installation must comply with all norms and standards. • Batteries that have reached the end of their life-cycle are to be appropriately removed,	Owner	Visual monitoring	Daily - weekly

	spills, leaks etc. from the BESS	preventing any spills or contamination, and are to be appropriately transported to a licenced recycling facility or hazardous waste disposal site. • Any hazardous materials should be stored in an appropriate manner to prevent contamination of the site. • Any accidental spills (chemicals, fuel, oil etc) that occur must be cleaned up in an appropriate manner. Contaminated soil, material etc. will need to be appropriately disposed of at a licenced facility.			
Management of Natural Areas	Prevent impacts on, and loss of, adjacent natural vegetation	• Natural areas must be managed as close to natural as possible (no interference wherever possible). • Alien vegetation should be removed from the remaining natural areas and disturbed areas that are within or adjacent to any riparian zone and the areas should be kept clear of alien vegetation. This should be implemented as soon as possible, and the alien vegetation removal programme be in place permanently to address any new growth which may occur. Land owner is responsible for the implementation of the alien vegetation removal and control on the site and the property. • All listed invasive alien vegetation must be removed in accordance with CARA legislation (The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)) as revised.	Owner	Visual monitoring	Weekly

APPENDIX 1: DECLARATION OF UNDERSTANDING

KAKAMAS WWTW

DECLARATION OF UNDERSTANDING

I _____

Representing: _____

Declare that the conditions of the EMP were brought to my attention and that I have read and understood the contents of this Environmental Management Plan as prepared by EnviroAfrica, of which a copy has been made available to me.

Site: _____

Date: _____

I also declare that I understand my responsibility in terms of enforcing and implementing the Environmental Specifications as set out in this Environmental Management Programme.

I also undertake to inform all persons under my supervision of these specifications and the contents of the Environmental Management Programme.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

APPENDIX 2: ENVIRONMENTAL AUTHORISATION

To be included on approval (before construction begins).

APPENDIX 3: Maps & Drawings

Site Development Plan including No-go areas and buffers

APPENDIX 4: START-UP REPORT

To be included after start-up meeting.

APPENDIX 5: PENALTIES FOR NON-COMPLIANCE

PENALTIES FOR NON-COMPLIANCE

The contractors / sub-contractors must contact the ECO at any stage if unsure about any matter, or if a pollution incident occurs, or vegetation or animals are damaged.

ECO = Environmental Control Officer ESO= Environmental Site Officer

PHASE	**Penalty for Non-compliance**	
PRE-CONSTRUCTION PHASE	**Bottom range**	**Top Range***
Construction area to be marked off before construction starts.		5000
The demarcated area must be maintained throughout the construction phase	500	1000
Site area for stock piling of building material must be demarcated	500	5000
Site area for storing of waste material must be demarcated	500	5000
Fencing off the construction site with mesh fencing of 1.8m, where necessary or other suitable material as agreed on by ECO	500	1000
Sitting of access road/s to be approved by ECO & demarcated with stakes before any construction starts (if applicable)		5000
Temporary route used for construction must be determined on site with ECO (if applicable)	1000	5000
Telecommunications & AC power routes must be determined with the ECO (if applicable)	1000	5000
Sensitive features that may be harmed must be clearly marked or demarcated.	500	2000
Vegetation that may not be removed must be clearly marked or demarcated.	500	5000
Contractor must make the Construction team and all sub-contractors aware of all environmental aspects that could lead to imposition of penalties	100	5000
Contractor to sign Declaration of understanding (DOU) before construction starts		5000
Contractor to assure that all subcontractors be informed and signed DOU	1000	5000
Method statements must be provided on request by the ECO. No work may commence until the Method Statement is accepted by the ECO and Engineer	1000	5000
CONSTRUCTION PHASE		
Information		
A copy of the EMP & Record of Decision with all the conditions of approval, and the relevant Method Statements must be at site at all times.	200	5000
Construction crew behaviour		

Construction crews may not overnight on site.	200	5000
No amplified music allowed on site	100	200
Construction crew must stay within the demarcated construction area. (Applicable in sensitive sites)	50	500
Eating of meals only allowed in demarcated area	50	500
No pets permitted on site		100
Driving, Parking & Storing of machinery and vehicles are only allowed inside demarcated areas and existing roads	1000	5000
Machinery may only be used on the road and may not disturb the vegetation on the sides of the road except if cleared by ECO. Machinery used must be carefully considered to limit environmental damage	500	5000
No vegetation other than that agreed on may be damaged - i.e. no access to areas outside construction area.	500	2000
No individual may cause unnecessary damage to flora and fauna on, around or near the site	20	2000
No littering allowed (incl. cigarette butts)	50	500
Excavations		
No topsoil may be removed or altered outside the demarcated area and/or which was not specified.		2000
Commercial sources of sand, rock and gravel to be cleared with ECO	200	5000
All surplus material to be taken off-site and be disposed of at approved site	500	5000
Toilets		
Sufficient ablution facilities must be provided		3000
Toilets to be secured to prevent them from falling or blowing over.	100	1000
They must be serviced regularly, (according to the manufacturer's instructions) and kept clean.	100	1000
Everybody on site must make use of ablution facilities	50	1000
Fire Prevention		
All mandatory fire fighting equipment (as specified at start-up) must be on site at all times	500	4000
Fire fighting equipment to be in good working order and serviced.	500	2000
No fires, including cooking fires, allowed on site	1000	5000
Cement		

Concrete may only be mixed within the boundaries of the demarcated area and/or where was agreed on by the ECO.	500	5000
All excess cement & concrete mixes to be contained on construction site prior to disposal off site	200	5000
Any cement / concrete spillage to be cleaned up immediately.	500	5000
Ready-mix delivery trucks must not carry out the wash down of their trucks on or around the site unless arranged with ECO.	1000	3000
Dust pollution control		
Ensure that loose building material is covered to prevent dust pollution	100	1000
Water run-off		
Contamination of water bodies, rivers, dams or wetlands must be prevented at all cost	500	5000
Rainwater from construction & building site/s must be channelled, contained & allowed to dry out, so as not to transport any pollutants into the surrounding area. Temporary trenches, straw stabilising, brush cutting can be used	500	5000
Waste control		
Sufficient refuse bins must be placed on site	500	2000
Refuse bins must be cleaned on a regular basis	100	1000
General litter / building refuse must be cleaned up on a regular basis from the site	500	3000
Cement-contaminated water; paint; oil; cement slurries etc must be stored in watertight containers or as agreed with ECO	500	5000
Store all refuse & waste material in wind & animal proof containers	100	1000
Waste must be disposed of at an official waste deposit site on a regular basis.	500	5000
The absence of or inadequate drip trays or bunding facilities	500	5000
Failure to address oil/fuel leaks from on-site machinery	200	5000
Herbicides		
No herbicides or pesticides whatsoever may be used.	200	2000
Construction road		
Road must be upgraded to prevent degradation and erosion of the road and surrounds.	500	5000
Power and Telecommunications supply		
Demarcate power supply route	500	5000

No vehicles to drive through vegetation unless authorised by ECO	500	5000
Storage of equipment may only take place at an area demarcated by the ECO.	500	5000
Working must be done in phases to prevent trampling of vegetation	N/A	
Use of generators and fuel powered equipment		
A watertight cover must be place under the power generator equipment to prevent accidental spillage of fuel & oil seeping into the soil.	500	5000
Drip tray must be able to take 120% of fuel on site	500	5000
All waste material generated from the use of this equipment must be contained and removed from the site	500	5000
Mobile fuel powered equipment must be well maintained and must not have any fuel or oil leaks.	200	5000
Soil Stabilisation		
Ensure that soil material for filling and stabilisation comes from a source that does not contain seeds alien to the area. The source must be cleared with the ECO.	100	2000
Rehabilitation		
Remove rocks and stones and stock pile in area recommended by ECO	500	5000
Remove all plants that can be used for rehabilitation and store on- or off-site in appropriate manner as agreed with ECO	200	5000
Removal of all old concrete and alien materials from site	500	5000
Site must be cleared of all waste and building material	500	5000

*(Large scale / repeated offence)

APPENDIX 6: INFO ON METHOD STATEMENTS

INFORMATION ON METHOD STATEMENT

Method Statements are to be completed by the person undertaking the work (i.e. the Contractor). The Method Statement will enable the potential negative environmental impacts associated with the proposed activity to be assessed.

The Method Statement can only be implemented once approved by the ECO

The Contractor (and, where relevant, any sub-contractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the methodology contained in the approved Method Statement.

The ECO will use the Method Statement to audit compliance by the Contractor with the requirements of the approved Method Statement.

Changes to the way the works are to be carried out must be reflected by amendments to the original approved Method Statement; amendments require the signature of the ECO denoting that the changed methodology or works are necessary for the successful completion of the works, and are environmentally acceptable. The Contractor will also be required to sign the amended Method Statement thereby committing him/herself to the amended Method Statement.

This Method Statement MUST contain sufficient information and detail to enable the ECO to apply their minds to the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of him/her in order to undertake the works.

THE TIME TAKEN TO PROVIDE A THOROUGH, DETAILED METHOD STATEMENT IS TIME WELL SPENT. INSUFFICIENT DETAIL WILL RESULT IN DELAYS TO THE WORKS WHILE THE METHOD STATEMENT IS REWRITTEN TO THE ER'S AND ESO'S SATISFACTION.

The page overleaf provides a *pro forma* method statement sheet, which needs to be completed for each activity requiring a method statement in terms of the EMP.

APPENDIX 7: EXAMPLE OF METHOD STATEMENT

PRO-FORMA METHOD STATEMENT

CONTRACT:…….. **DATE:**……..

PROPOSED ACTIVITY (give title of method statement and reference number):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:	End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):

Note: please attach extra pages if more space is required

DECLARATIONS

1) ENVIRONMENTAL CONSULTANT AND/OR ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ _____

(Signed) (Print name)

_____ _____

(Signed) (Print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ESO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

3) THE APPLICANT

The works described in this Method Statement are approved.

_____ _____ _____

(Signed) (Print name) (Designation)

Dated: _____

APPENDIX 8: CONTACTOR ENVIRONMENTAL CHECKLIST

CONTACTOR/S REPRESENTATIVE: ENVIRONMENTAL WEEKLY CHECKLIST

SITE: _____

PHASE OF WORK AND % OF COMPLETION: _____

ENVIRONMENTAL ASPECT	YES/ NO (✓ or X)	COMMENTS
How many workers are on site		
All new personnel on site are aware of the contents of the EMP and have been through the environmental awareness course.		
Contractor's camp is neat and tidy and the labourers' facilities are of an acceptable standard.		
Sufficient and appropriate fire fighting equipment is visible and readily available.		
Waste control and removal system is being maintained.		
Refuse bins in place and maintained		
Toilets are in place and clean		
Demarcation and other fences are being maintained.		
What machinery are on site		
Drip trays are being utilised where there is a risk of incidental spillage		
Bunds/ drip trays are being emptied on a regular basis (especially after rain).		
No leakages (oil & fuel) are visible from construction vehicles		
No go areas, remaining natural features and trees have not been damaged.		
Dust control measures (if necessary) are in place and are effectively controlling dust.		
Noise Control measures (if necessary) is in place and is working effectively.		
Erosion control measures (if necessary) are in place and are effective in controlling erosion. (Access road, site areas etc.)		
Stockpiles are located within the boundary of the site, do not exceed 2 m in height and are protected from erosion.		

Completed by:…… Sign:…….. Date:……

To be submitted at the end of each week to the Environmental Site Officer (ESO)

Received by:

Environmental Site Officer: :…… Sign: Date:……

APPENDIX 9: BASIC RULES OF CONDUCT

BASIC RULES OF CONDUCT

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

NOTE: **ALL new site personnel must** attend an environmental awareness presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ESO.

DO:

- Use the toilet facilities provided – report dirty or full facilities
- Clear your work areas of litter and building rubbish at the end of each day – use the waste bins provided and ensure that litter will not blow away.
- Report all fuel or oil spills immediately & stop the spill continuing.
- Dispose of cigarettes and matches carefully. (Littering is an offence.)
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Prevent contamination or pollution of streams and water channels.
- Ensure a working fire extinguisher is immediately at hand if any "hot work" is undertaken e.g. welding, grinding, gas cutting etc.
- Report any injury of an animal.
- Drive on designated routes only.
- Prevent excessive dust and noise.

Do not:

- Remove or damage vegetation without direct instruction.
- Make any fires.
- Injure, trap, feed or harm any animals – this includes birds, frogs, snakes, lizards etc.
- Enter any fenced off or marked area.
- Allow cement or cement bags to blow around.
- Speed or drive recklessly
- Allow waste, litter, oils or foreign materials into the stream
- Swim in the dam.
- Litter or leave food laying around

Notes:

If any animals such as tortoises, chameleons or snakes be encountered then do not harm them. The ECO or Site Supervisor must be contacted to remove these safely. The harming of any animal will result in disciplinary action.

Construction and heavy machine operators must be particularly sensitive to staying within access routes and prevention of unnecessary damage. Dust and noise is also of particular concern. Ensure that vehicles and machinery do not leak fuel or oils. Refuelling or maintenance must be done within the maintenance camp area only.

Alien plant clearing and control work teams must be closely supervised.

BASIESE GEDRAGSKODES

Die volgende lys vertenwoordige die moets en moenies vir omgewingsbewustheid wat alle deelnemers aan hierdie projek in ag moet neem tydens die uitvoer van hul take. Hierdie lys is nie volledig nie en dien slegs as 'n vinnige verwysing.

Nota: **alle nuwe terreinpersoneel moet** 'n aanbieding ten opsigte van omgewingsbewustheid bywoon. Indien u nog nie so 'n aanbieding bygewoon het nie, lig asseblief u voorman of bestuurder in of kontak die omgewings terreinbeampte.

Moets:

- Gebruik die beskikbare toilet-geriewe – rapporteer vuil of vol geriewe.
- Maak u werkplek skoon van rommel of bourommel aan die einde van elke dag – gebruik beskikbare vullisdromme en verseker dat rommel nie rondwaai nie.
- Rapporteer alle brandstof- en olie stortings onmiddellik – stop verdere storting.
- Wees versigtig met die wegdoen van sigarette en vuurhoutjies. (rommelstrooi is 'n oortreding.)
- Beperk werkaktiwiteite en die stoor van toerusting tot die onmiddellike werkarea.
- Gebruik veiligheidstoerusting en voldoen aan alle veiligheids-maatreëls.
- Voorkom besoedeling van strome en waterbane
- Verseker dat 'n brandblusser in werkende toestand byderhand is wanneer "warm" werk verrig word bv. Sweis, wegslyp, gasny, ens.
- Rapporteer beseerde diere.
- Ry slegs op aangewese roetes.
- Voorkom oormatige stof en geraas.

Moenie:

- Plantegroei verwyder of beskadig sonder direkte instruksie nie.
- Enige vure maak nie.
- Enige diere dood, beseer, vang of voer nie, insluitende voëls, paddas, slange, akkedisse, ens.
- Enige omheinde of afgesperde areas binnetree nie.
- Sement of sementsakke laat rondwaai nie.
- Vinnig of roekeloos bestuur nie.
- Enige rommel, afval, olie or enige vreemde materiaal in strome laat beland nie.
- In die dam swem nie.
- Rommelstrooi of kos laat rondlê nie.

Notas:

Indien enige diere soos skilpaaie, verkleurmannetjies of slange teëgekom word, moet hulle nie beseer of dood nie. Kontak die otb of ri om hulle veilig te verwyder. Die besering van diere sal lei tot dissiplinêre optrede.

Operateurs van konstruksie- en swaar masjiene moet veral versigtig wees om binne toegangsroetes te bly en om enige onnodige skade te voorkom. Verseker dat voertuie en masjiene nie olie of brandstof lek nie. Brandstofaanvulling en voertuigonderhoud mag slegs binne die onderhoudsarea gedoen word.

Streng toesig moet gehou word oor indringerplantbeheerspanne.

EZIPPHAMBILI EKUNYANZELEKILEYO UKUBA ZENZIWE

Zonke ezi zinto zilandelayo zizinto ekufuneka zenziwe nekufuneka zingenziwanga.

Wonke umntu ofikayo kufuncka afundiswe ngemigaqo kupala. Needa yazisa iforman yakho ikuba awukhange uye kufundiswa.

Izinto emazenziwe

- Sebenzisa izindlu zangasese, yazisa xa kukho umonakalo.
- Zama ukucoca apho ubusebenza khona.
- Sebenzisa imigqomo yenkukuma ungayeki iphaphtieke.
- Yazisa xa ubona ioil echithskalayo okanye ipetrol.
- Cima lozoli cigarette xa ugqibibile ukutshaya
- Zonke izixhobo usebenza zibuyisele apho zihlaka khona xa ucgibile apho zihlala khona xa ugqibile ukuzisebenzisa.
- Zisebenzise izikhuselixa uzinkiwe.
- Sukugalela izinto emlanjeni.
- Masibekho isicima mlilo xausebenza ngomlilo.
- Yazisa msinyane xa ubone isilwanyana ezonzakeleyo.
- Xauqhuba isithuthi hamba endleleni qha ungafathulinje.
- Naphina zamaungenzi thuli okanye ingxolo xa usebenza.

Emazingenziwa

- Sukususa nesiphina isityalo ungakhange uxelelwe
- Sukwenza mlilo nokuba sekubanda
- Amagqara ukubulala izilwanyana nokuzifida akuvumelekanga
- Sukungena xa kuvaliwe ngaphandle kwe mvume
- Ingxowa zesamente mazincedwe zingalahlwa nje
- Sukuqhuba ngesantya esiphakamileyo
- Sukugalele nayiphi into phaya emlanjeni
- Sukuqubha edameni q oqosha yonk inkukuma

APPENDIX 10: ECO/ESO REPORT/CHECKLIST

ECO / ESO SITE VISIT CHECKLIST / REPORT:

PROJECT NAME: DATE

PROJECT & PHASE: LOCATION

ENVIRONMENTAL ASPECT		ENTS
Note: 1 = Poor, 2 = Average, 3 = Good NA = Not Applicable		
DEMARCATION **METHOD STATEMENT** **Boundaries of "no go" areas, construction sites, offices, temporary storage areas as well as labourer's facilities must be demarcated (EMP and ECO requirements) and maintained for the length of the construction period.**		
NO-GO AREAS/PROTECTION OF FAUNA & FLORA **Identified "No-Go Areas", remaining natural veld and indigenous- or significant trees are protected features and must be demarcated for protection from construction damage (including secondary impact).** **All areas outside of the demarcated construction sites and access roads to be regarded as NO-GO areas unless otherwise agreed upon with the client and ECO.** **All flora identified to be rescued must be removed and placed in an area specifically allocated and taken care off until re-used in pre-approved way.** **Identified areas with significant vegetation must be protected as NO-GO areas.**		
CLEARING OF VEGETATION & TOPSOIL REMOVAL **METHOD STATEMENT** **Before any construction or earthworks, topsoil must be stripped (>150mm) and stockpiled for rehabilitation/ landscaping. Stockpiles:** **must be protected (may not blow or wash away or gets compacted) and stored separately.** **may not be moved further than 50m or mixed with any other soil.** **must be convex and should not exceed 2m in height.** **In addition:** **Cleared areas must be stabilized.** **Burning or burying of cleared vegetation is prohibited, but may be used for mulch or slope stabilisation on site.**		
STOCKPILING **METHOD STATEMENT** **Top- and subsoil's from trenches must be located within site boundaries, stabilised and may not exceed 2m in height.**		
TEMPORARY STORAGE FACILITIES **METHOD STATEMENT** **Must be demarcated, organised, neat and tidy and of acceptable standards.**		
CONSTRUCTION CAMP & SITE OFFICES **METHOD STATEMENT** **Must be demarcated, organised and free of day-to-day litter (maintaining good housekeeping standards).**		

ENVIRONMENTAL ASPECT		ENTS
Note: 1 = Poor, 2 = Average, 3 = Good NA = Not Applicable		
FUEL STORAGE **METHOD STATEMENT** **Fuel storage areas must be situated within the demarcated construction camp site (or an area approved by the ECO).** **Bunds must be built (EMP and ECO requirements) around larger fuel storage areas (accidental spillages).** **Drip trays must be used (in accordance with EMP) at all fuel and oil storage and refilling sites and must be cleaned regularly, especially after rain.**		
LABOURER'S FACILITIES **METHOD STATEMENT** **Facilities must be of acceptable standards suitably demarcated, well maintained, neat and tidy and with adequate ablution facilities.**		
ENTRANCE AND HAUL ROADS **METHOD STATEMENT** **Only approved entrance and haul roads may be used (existing roads and infrastructure). No new roads or parking areas may be developed without written approval from the ECO.**		
MANDATORY SITE EQUIPMENT **METHOD STATEMENT** **Mandatory site equipment must be in place, well maintained and in accordance with EMP and ECO requirements.** **Sufficient refuse bins must be on site (well placed and conspicuous) and must be cleaned regularly.** **Fire extinguishers must be readily available, maintained and functional.** **Drip trays must be used (in accordance with EMP) at all fuel and oil storage and refilling sites and must be cleaned regularly, especially after rain.** **Toilets and sanitation facilities must be kept clean neat and hygienic (toilet paper must be available).**		
WASTE CONTROL **METHOD STATEMENT** **The contractor is expected to control all construction related waste material and general litter on actual construction sites and its immediate surroundings.** **Waste management must be in accordance with the EMP, of acceptable standards, with regular removal of general waste, hazardous waste as well as construction waste (e.g. concrete waste and spoil).**		
CEMENT MIXING & BATCHING AREAS **METHOD STATEMENT** **Mixing areas must be approved by the ECO, suitably demarcated and may not result in pollution.** **Polluted cement water may only be released into sedimentation ponds.** **Sedimentation ponds must be maintained and cleaned regularly (and reinstated after use).**		

ENVIRONMENTAL ASPECT		ENTS
Note: 1 = Poor, 2 = Average, 3 = Good NA = Not Applicable		
CONSTRUCTION VEHICLE MAINTENANCE **METHOD STATEMENT** **Construction vehicles must be in good working order and well maintained to prevent oil and fuel leakages and to reduce noise levels.** **Maintenance areas must be approved by ECO.** **Refuelling must be done in accordance with the EMP, using drip trays.**		
HEAVY EARTHMOVING EQUIPMENT **Construction vehicles and equipment may only operate <u>within</u> the demarcated site boundaries (and approved access roads), especially heavy earthmoving vehicles.**		
DUST CONTROL **METHOD STATEMENT** **Adequate control measures must be in place to prevent dust pollution as a result of construction activities (especially with regard to entrance-, haul roads and exposed surfaces).** **Areas of concern must be watered regularly during construction AND periods of strong winds, BUT must take water saving into account.**		
EROSION CONTROL **METHOD STATEMENT** **Erosion resulting from works must be controlled.** **Temporary and permanent drainage works must be maintained.** **Erosion damage and damage in drainage courses must be reinstated.**		
NOISE CONTROL **METHOD STATEMENT** **Effective noise control measures must be in place and acceptable working hours must be kept (deviations must be approval by the ECO).**		
ENVIRONMENTAL CONDUCT **Environmental conduct of construction personnel must be acceptable (e.g. no burning or burying of refuse; no littering and no cement bags or other construction waste material lying around).**		
ARCHAEOLOGICAL & HERITAGE FINDS **METHOD STATEMENT** **Should any archaeological or heritage remains be exposed during excavations or any activity on site, these must immediately reported to The site agent/engineer, the ECO or SAHRA.**		
REHABILITATION **METHOD STATEMENT** **On completion of the project or phase, all areas impacted by the construction activities must be reinstated and/or rehabilitated to the satisfaction of the ECO with emphasis on the following:** **Site offices must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO.** **Labourer's facilities must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO.**		

ENVIRONMENTAL ASPECT		ENTS
Note: 1 = Poor, 2 = Average, 3 = Good NA = Not Applicable		
All construction site areas must be rehabilitated or reinstated to the satisfaction of the ECO. **All temporary fencing and demarcation must be removed and the areas reinstated to the satisfaction of the ECO.** **Temporary storage areas must be rehabilitated or reinstated to the satisfaction of the ECO.** **All remaining construction material must be removed and the areas rehabilitated or reinstated to the satisfaction of the ECO.** **Any additional disturbed areas must be rehabilitated or reinstated to the satisfaction of the ECO.**		
ADDITIONAL METHOD STATEMENTS **Method statements must be submitted and approved before commencement of the works and must be available at the site offices.**		
ENVIRONMENTAL CHECKLIST **The contractor must ensure that the weekly environmental checklist is completed at the end of each week and it must be available at the site offices.**		
SPOT FINES & PENALTIES **Spot fines and penalties must be recorded and documented by the ECO (in accordance with the EMP).**		
FIXED POINT PHOTOS **Photographs must be taken by the ECO, Site Engineer and or Site Manager, prior to, during and immediately after construction as visual reference. These photographs must be stored with other records relating to the EMP.**		

ECO:

ECO OBSERVATION SHEET

APPENDIX 11: METHOD STATEMENT REGISTER

METHOD STATEMENT REGISTER		Principle Site Agent:			Project Name:		
		Main Contractor:			Project location:		
No.	METHOD STATEMENT ACTIVITY REFERENCE	DATE CREATED	DATE RECEIVED	CREATED BY	ACCEPTED / REJECTED	DATE approved	Approved By
1	Demarcation						
2	Clearing of vegetation and topsoil removal						
3	Stockpiling						
4	Temporary storage facilities						
5	Construction camp and site offices						
6	Fuel storage						
7	Labourer's facilities						
8	Entrance and haul roads						
9	Mandatory site equipment						
10	Waste management/control						
11	Cement mixing and batching areas						
12	Construction vehicle maintanance						
13	Dust control						
14	Erosion control						
15	Noise control						
16	Archaeological and heritage finds						
17	Rehabilitation						
18							
19	**Additional MS (Waste Licence requirements)**						
20							
21							
22							

APPENDIX 12: ENVIROMENTAL INCIDENT REPORT FORM

ENVIRONMENTAL INCIDENT REPORT

PROJECT NAME: _____

PROJECT LOCATION: _____

SITE AGENT: _____

DATE OF INCIDENT: _____ **TIME:** _____

BRIEF DESCRIPTION AND CAUSE OF INCIDENT:

WHAT IMMEDIATE ACTIONS/CONTROL MEASURES WERE TAKEN:

WHAT CORRECTIVE ACTIONS WERE TAKEN TO ENSURE NO REPEATS OF THE INCIDENT:

ECO/ESO RESPONSE TO INCIDENT AND RECOMMENDATIONS:

IS THIS INCIDENT A: o **FIRST OFFENCE** o **SECOND OFFENCE** o **THIRD OFFENCE**

SIGNATURE OF SITE AGENT: _____ **DATE:** _____

SIGNATURE OF ECO/ESO: _____ **DATE:** _____

REMEMBER: TO BE FACTUAL WHEN DESCRIBING THE INCIDENT.

APPENDIX 13: COMPLAINTS REGISTER FORM

COMPLAINTS REGISTER FORM

(To be completed by Site Agent/Supervisor)

NO.	DATE	NAME OF COMPLAINANT	CONTACT NO.	NATURE OF COMPLAINT	ACTION TAKEN TO RECTIFY COMPLAINT