DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME
FOR
THE PROPOSED ESTABLISHMENT OF AN INTEGRATED HUMAN SETTLEMENT AND RELATED INFRASTRUCTURE ON ELANDSKUIL FARM NO.205 & 206 IP, VENTERSDORP WITHIN THE JURISDICTION OF JB MARKS LOCAL MUNICIPALITY, IN THE NORTH WEST PROVINCE.
REF: NWP/EIA/51/2017

DATE: 12 February 2018

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TERMS AND DEFINITIONS

TERMS	DEFINITIONS
Archaeological Resources	This includes (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation; wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.
Alien vegetation	all undesirable vegetation, defined as but not limited to, all declared category 1 and category 2 plants in terms of the Conservation of Agricultural Resources Act (43 of 1983) (CARA) amended regulations 15 and 16 as promulgated in March 2001
Building and Demolition Waste	Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any building structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition
Contractor	A person or company appointed by the within JB Marks Municipality to carry out stipulated activities.
Construction activity	Any action taken by the Contractor, his subcontractors, suppliers or personnel in undertaking the construction work.
Construction area(s)	All areas used by the Contractor in order to carry out the required construction activities. This includes all offices, accommodation facilities, testing facilities/laboratories, batching areas, storage & stockpiling areas, workshops, spoiling areas, access roads, traffic accommodation (e.g. bypasses), etc.

TERMS	DEFINITIONS
Cultural Significance	Companies and or individual persons appointed on behalf of the Client to undertake activities, as well as their sub-contractors and suppliers
Development	This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including: • Construction, alteration, demolition, removal or change in use of a place or a structure at a place; • Carrying out any works on or over or under a place; • Subdivision or consolidation of land comprising a place, including the structures or airspace of a place; • Constructing or putting up for display signs or boards; • Any change to the natural or existing condition or topography of land; and • Any removal or destruction of trees, or removal of vegetation or topsoil.
Degradation	The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation, atmospheric degradation.
Environmental Management Plan	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of a project. Environmental Management System and ISO14001 standard compliance system if this has been instituted.
Environment	In terms of the National Environmental Management Act (NEMA) (No 107 of 1998), "environment" means the surroundings within which humans exist and that are made up of: (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) of (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

TERMS	DEFINITIONS
Emergency	An undesired event that results in a probable significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.
Project Manager	The person appointed by King & Associates projects from time to time to act in the capacity and notified, by name and in writing by the client to the Contractor, to act as required in the contract.
Environmental Control Officer	An individual nominated through the Project Coordinator to be present on site to act on behalf of the Project Co-coordinator in matters concerning the implementation and day to day monitoring of the Environmental Management Programme.
Environmental impact	The change to the environment resulting from an environmental aspect (an activity) on the environment, whether desirable or undesirable .An impact may be the direct or indirect consequence of an activity.
Environmental Assessment Practitioner:	Means the individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations
Environmental Management Programme	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.
General Waste	General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes - • domestic waste; • building and demolition waste; • business waste; and • inert waste
Groundwater	Subsurface water in the zone in which permeable rocks, and often the overlying soil, are saturated under pressure equal to or greater than

TERMS	DEFINITIONS
	atmospheric
Heritage resource	Any place or object of cultural significance including buildings, structures, landscapes, graves and geological, archaeological and paleontological sites
Impact	Description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Incident	An undesired event which may result in a significant environmental impact but can be managed through internal response.
Natural vegetation	All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.
Mitigation	Measures designed to avoid, reduce or remedy adverse impacts.
Pollution	Any change in the environment caused by substances, radioactive or other waves, or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Protected plants	Plant species officially listed on the Protected Plants List (each province has one), and which may not be removed or transported without a permit to do so from the relevant provincial authority.
Red Data species	Plant and animal species officially listed in the Red Data Lists as being rare, endangered or threatened.
Recycle	A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.
Riparian vegetation	Vegetation occurring on the banks of a river or stream (i.e. vegetation fringing a water body).
Topsoil	This is defined as the A horizon of the soil profile. Topsoil is the upper

TERMS	DEFINITIONS
	layer of soil from which plants obtain their nutrients for growth. It is often darker in colour, due to the organic (humic) fraction, but regardless of the fertility appearance, structure, agriculture potential, this profile constitutes the topsoil.
Transplanting	The removal of plant material and replanting the same plants in another designated position.
Sedges	Grass-like plants growing in wetland/marshy areas or adjacent to water.
Site Manager	The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the construction Phase. The Site Manager will liaise with the Principal Agent in order to ensure that the project is conducted in accordance with the environmental management programme.
Rehabilitation	Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Revegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.
Water body	Any open body of water including streams, dams, rivers and lakes.
Weeds and invader plants	Weeds and invader plants are defined as undesirable plant growth that shall include, but not be limited to all declared category 1, 2 and 3 listed invader species as set out in the Conservation of Agricultural Resources Act (No 43 of 1983) regulations. Other vegetation deemed to be invasive should be those plant species that show the potential to occupy in number, any area within the defined construction area.
Wetland	A seasonally, temporarily or permanently wet area, often exhibiting a specific vegetation community, for example, sedges, rushes, reeds, hydrophilic grasses, ground-covers and trees
Wetland Vegetation	Vegetation which is indicative of a wetland environment – for example,

TERMS	DEFINITIONS
	sedges, rushes, reeds, hydrophilic grasses and ground-covers.
Sustainability	Meeting the needs of today without compromising the ability of future generations to meet their own needs
Emergency	An undesired event that does result in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority
Mitigation measures	Mitigation seeks to find better ways of doing things, by the implementation of practical measures to reduce, limit, and eliminate adverse impacts or enhance project benefits and protect public and individual rights.
Incident	An undesired event which may result in a significant environmental impact but can be managed through internal response
Safety, Health and Environmental Plan	A documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce of control the hazards identified.

ABBREVIATIONS AND ACRONYMS

DPW&R	Department of Public Works & Roads
DWS	Department of Water Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIR	Environmental Impact Report
EMS	Environmental Management Systems
EPP	Emergency Preparedness Plan
I&APs	Interested and Affected Parties
NW-READ	North West Department of Rural, Environment and Agricultural Development
PDSs	Project Delivery Standards
PPE	Personal Protective Equipment
OHSA	Occupational Health and Safety Act

1. INTRODUCTION

Lesekha Consulting has been appointed by King & Associates and on behalf of the Applicant the Department of Local Government and Human Settlement to conduct an Environmental Impact Assessment for the proposed Establishment of an Integrated Human Settlement and related infrastructure on Elandskuil Farm No.205 & 206 IP, in Ventersdorp within the jurisdiction of JB Marks Local Municipality, in the North West Province.

Lesekha Consulting has been appointed as an independent Environmental Assessment Practitioner (EAP) responsible for facilitating the legally required Environmental Impact Assessment for the proposed establishment of the Integrated Human Settlement. The National Environmental Management Act (No. 107 of 1998) (as amended) (NEMA provides various measures for the prevention of pollution and ecological degradation, as well as for ecologically sustainable development in order to protect human health and the environment. The relevant application has already been lodged with the NW Department of Rural Environment Agriculture and Development for environmental authorisation, with the reference number as: **NWP/EIA/51/2017.** As such, an Environmental Impact Assessment Application process (EIAR) will be undertaken to obtain an environmental authorisation for the proposed project.

1.1 OBJECTIVES OF THE EMPr

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts. The objectives of this EMPr are to:

- Define the environmental management objectives to be realized during the life of the Establishment of an Integrated Human Settlement and related infrastructure on Elandskuil Farm No.205 & 206 IP, in Ventersdorp within the jurisdiction of JB Marks Local Municipality, in the North West Province. I.e. pre-construction, construction, operation and decommissioning phases in order to enhance benefits and minimise adverse environmental impacts and meet the performance specifications.
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
  - To identify measures that could optimize beneficial impacts.
  - To create management structures that addresses the concerns and complaints of I&APs with regards to the construction that will take place.
  - To establish a method of monitoring and auditing environmental management practices during all phases of the construction.

- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the Integrated Human Settlement
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.

- Specify time periods within which the measures contemplated in the final environmental management plan must be implemented, where appropriate.
- Description of detailed actions needed to achieve these objectives, including how they will be achieved, by whom, by when, with what resources, with what monitoring / verification, and to what target or performance level.
- Allocate responsibilities in terms of mitigation, monitoring, reporting and review.
- Ensure compliance with regulatory authority stipulations, which may be local, national and / or international.
- Verify environmental performance through information on impacts as they occur.
- Respond to changes in project implementation not considered in the EIA.
- Provide feedback for continual improvement in environmental performance.

This EMPr considers mitigation measures and recommendations contained in the following documents, commissioned and/or developed during the conceptual stage.

- 1. The Biodiversity Assessment Report
- 2. Heritage Impact Assessment Report
- 3. Geo-Hydrological Report
- 4. Flood line study Report
- 5. Geo-technical Report
- Traffic Impact assessment Report
- Engineering Service Investigation Report

1.2. FORMAT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

It is widely recognized that there is no standard format for EMPr is and that an EMPr may typically range from a few pages for a project with low project-related environmental risks, to a substantial document for a large-scale complex project with potentially high environmental risks. This project is

regarded as a large-scale project (extent of project activities) with low project-related environmental risks.

CATEGORY	PHASE	DESCRIPTION
Category A	**Construction**	This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and, therefore, the Contractor (or Contractors, including subcontractors) will be required to comply with the specifications to the satisfaction of the Project Manager and Construction Safety Officer, in terms of the construction contract.
Category B	**Operation**	This section of the EMPr provides management principles for the operational phase of the project. Environmental actions, Procedures and responsibilities as required by the prescripts of National Environmental Management Regulations.
Category C	**Decommission**	This section provide management principles of the decommission phase of the project. Environmental actions and requirements of the Regulations.

1.3. PROPOSED ACTIVITY

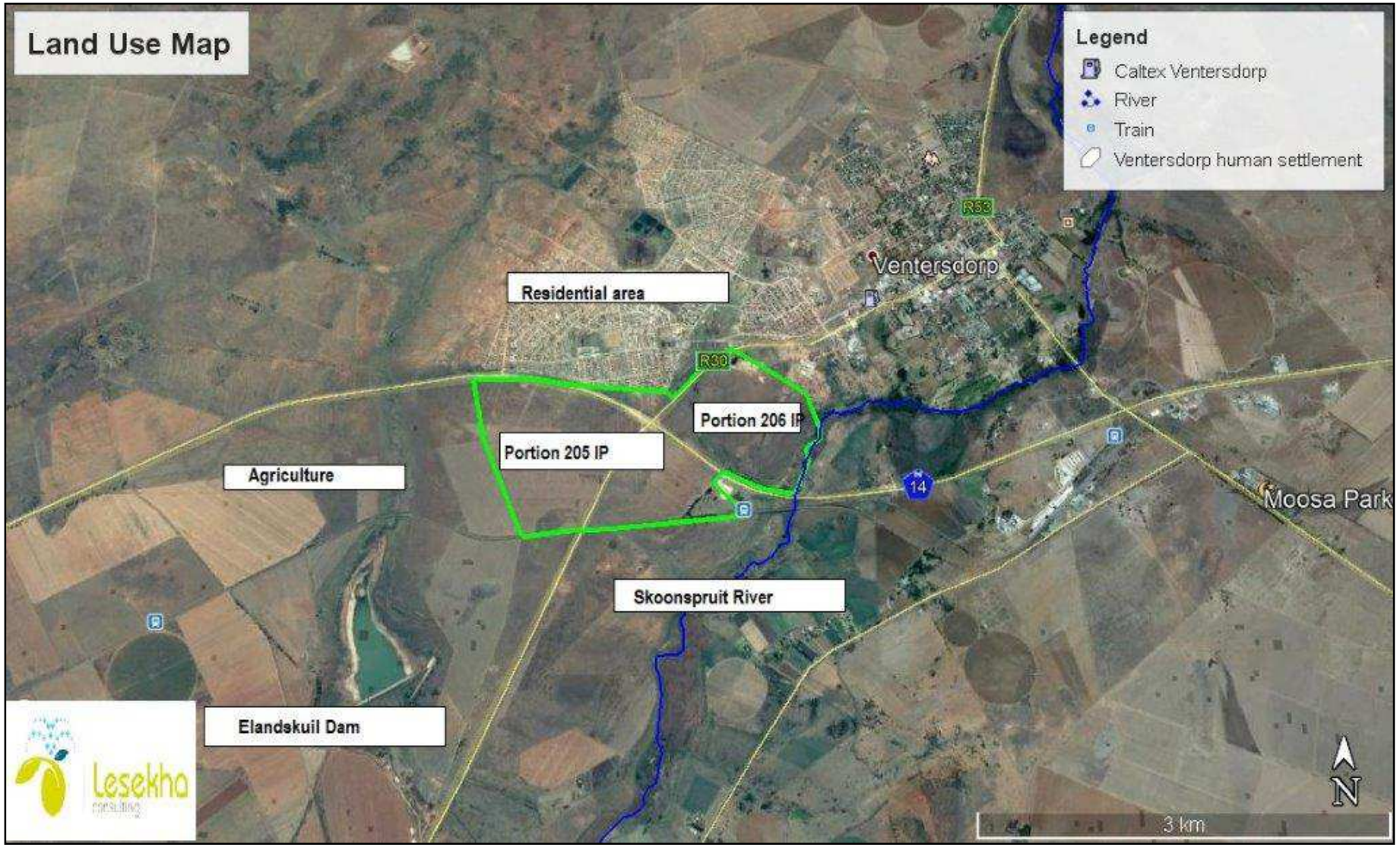
The Department of Local Government and Human Settlements is proposing the establishment of an Integrated Human Settlement and related infrastructure on Elandskuil. The proposed project is primarily aimed at providing affordable housing to lower income groups and will contribute to alleviating the current housing need in the area. Each housing unit/stand will be provided with electricity, potable water and sanitation. The proposed establishment of an Integrated Human Settlement will entail the following development:

- The development of approximately 3852 housing,
- Provision of open space areas for recreational use as well as for educational purposes;
- Breaking New Grounds (BNG) units,
    - Social housing;

- Community residential units
- Rental stock,
- Pre schools, Primary and Secondary schools;
- Police station;
- Churches;
- Government offices;
- Agricultural technical college;
- Multipurpose sports centre;
- Public open space
- Filling station
- FLISP (Finance Linked Individual subsidy programme) and serviced land for the gap market.
- Construction of the Reservoir

The extent of the site for the proposed development is approximately 280.7752 hectares.

1.3.1 Composite Map


Land Use Map
Legend
Caltex Ventersdorp
River
Train
Ventersdorp human settlement
Residential area
Ventersdorp
R53
R30
Portion 206 IP
Portion 205 IP
Agriculture
14
Moosa Park
Skoonspruit River
Elandskuil Dam
Lesekha
3 km
N

1.4. Details of a Practitioner

As per the requirements of the NEMA, the details and expertise levels of the persons who prepared the EIA Report are provided below.

DETAILS OF THE ENVIRONEMENTAL ASSESSMENT PRACTIONER(EAP)	
Environmental Consultants	Lesekha Environmental Consulting
Physical Address:	25 Caroline Close Rowland Estate Mafikeng 2745
Environmental Assessment Practitioner:	Lesego Senna
Expertise:	Lesego Senna is a qualified Environmental Practitioner; she managed and coordinated the EIA study of the project in discussion. She holds the Bachelor Degree: in Biological Science majoring in Microbiology and Biochemistry. She also holds an Honours Degree: Environmental Sciences, Majoring in Environmental Impact Assessment and Earth Sciences – North West University (Potchefstroom Campus). Lesego holds a certificate in Environmental Law (NQF level with the following courses: Waste Management, Biodiversity Management, Waste Management, Heritage Assessment, Environmental law & Environmental Impact Assessment obtained from the Centre of Environmental Management at Potchefstroom University). She also holds a certificate in GIS and GPS course (NQF level 5) from the Free State University, with the following Modules: Spatial data Structures; Spatial data symbolization and analysis and interpretation Map design. Lesego is a registered Environmental Scientist registered with the South African Council of Natural Scientific Profession SACNASP (Reg.No.300029/14). The acquired

	qualifications and experience demonstrated that we are uniquely qualified to undertake this Environmental Impact Assessment Study.

2. LEGISLATIVE AND OTHER REQUIREMENTS

The following legislation and guidelines were considered during the preparation of the EMPr:

2.1. Legislation

2.1.1 Constitution of the Republic of South Africa (1996, (Act 108 Of 1996)

Section 24 of the Constitution of South Africa (Act 108 of 1996) states that "*Everyone has the right (a)to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-*

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development". Section 152 of the Constitution states that the objectives of local government are to:
- Ensure that services are provided to communities in a sustainable manner;
- Promote social and economic development; and
- Promote a safe and healthy environment.

2.1.2 National Environmental Management Act (NEMA) 1998, (Act 107 Of 1998) And The New Amended EIA Regulations (2010)

The principles underpinning environmental management contained in the National Environmental Management Act (NEMA) 1998, (Act 107 of 1998) as Amended, must be taken into account by any organ of state in the exercise of any power that may impact on the environment. The principles underpinning environmental management contained in the NEMA, as stated in Section 2(4), are that sustainable development requires the consideration of all relevant factors including the following:

- That the disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimised and remedied;

- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That the development, use and exploitation of renewable resources and the ecosystems of which they are a part do not exceed the level beyond which their integrity is jeopardised; and
- That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Section 28(1) states that "*every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring*". If such degradation/pollution cannot be prevented, then appropriate measures must be taken to rectify or minimise such pollution. These measures may include, but are not limited to:

- Assessing the impact of the project or development on the environment;
- Informing and educating employees about the environmental risks of their work and possible ways of minimising such risks
- Ceasing, adapting or controlling actions which cause pollution/degradation;
- Preventing movement of pollutants;
- Eliminating the pollution source; and;
- Remedying the effects of the pollution.

2.1.3 National Water Act (NWA) 1998, (ACT 36 OF 1998)

Water use is controlled by the National Water Act (NWA) 1998, (Act 36 of 1998) and the enforcing authority is Department of Water Sanitation (DWS). The NWA recognises that water is a scarce resource in South Africa and its provisions are aimed at achieving sustainable use of water to the benefit of all users. The provisions of the Act are thus aimed at discouraging pollution and waste of water resources. According to Section 21 of the NWA the following activity is considered a use, and therefore requires authorisation:

2.1.4 Conservation Of Agricultural Resources (CARA) 1983 (Act 43 Of 1983)

The Conservation of Agricultural Resources Act (Act 43 of 1983) provides for the regulation of control over the utilization of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants and those listed under

Category 1 are prohibited and must be controlled while those listed under Category 2 must be grown within a demarcated area under permit. Category 3 plants includes ornamental plants that may no longer be planted but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood line of water courses and wetlands. The abundance of alien species at the site is generally very low.

2.1.5 National Environmental Management: Biodiversity Act, (Act 10 Of 2004) (NEMBA)

The National Environmental Management Biodiversity Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur.

The Act also provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered:** any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable:** any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). NEMBA also deals with endangered, threatened and otherwise controlled species, under the TOPS Regulations (Threatened or Protected Species Regulations). These regulations deal with the hunting industry as well as any other activities, which involve the cultivation, keeping or impacting listed species. A permit is required for any listed activities involving protected or endangered species. These permits are usually

administered by the provincial authorities and may take the form of an Integrated Permit, which covers both the provincial and national TOPS requirements. Apart from the TOPS Regulations NEMBA also provides for the regulation of certain activities, known as Restricted Activities.

2.1.6 National Forests Act (No. 84 of 1998)

The National Forests provides for the protection of forests as well as specific tree species, in terms of National Forest Act, section 15: "*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated*"

2.1.7 The protected Areas Act (Act No.57 of 2003)

Protected Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; and for matters in connection therewith.

2.1.8 NEMA Air Quality Act (AQA) 2004, (ACT 39 OF 2004)

The aim of this law is to regulate air quality and protect the environment in South Africa through reasonable measures to prevent pollution and ecological degradation, while securing sustainable development. The Act also provides national norms and standards for air quality management, monitoring and control.

Under this legislation, Priority Air shed Areas can be proclaimed, where specific Air Quality Management Plans are applicable. Regulations are also published under this Act for the format of air quality assessments and what should be included in the assessment. This Act may list activities which may result in atmospheric emissions and which may have a significant detrimental effect on the environment. Air quality limits and thresholds are fundamental to effective air quality management, providing the indicators to safe exposure levels for the majority of the population. The current South African standards have been revised and National Ambient Air Quality Standards were promulgated on the 24th of December 2009 (Government Gazette No. 32816, Notice No. 1210). The newly proposed standards include particulate matter specifically PM_{10} (particulates with a diameter of less than 10 micrometer), sulphur dioxide (SO_2), oxides of nitrogen (NOx), ozone (O_3), lead, carbon monoxide (CO)

and benzene. These revised standards have been adopted as the VTAPA air quality objectives. Any emissions from the proposed development should be within these standards.

2.1.9 National Environmental Management: Waste Act (NEMWA) 2008, (Act 59 Of 2008)

The National Environmental Management: Waste Act (NEM: WA) deals with regulating waste management in South Africa. In terms of Section 20 (b) of this Act, certain waste activities require a waste management license application. This Act was promulgated on 3 July 2009. Waste management activities that have, or are likely to have a detrimental effect on the environment have been published.

2.1.9.1 Water Services Act 1997, (Act 108 Of 1997)

This Act provides for the rights of people to amongst others, basic sanitation. It acknowledges that that there is a duty on all spheres of government to ensure that sanitation services are provided in a manner which is efficient, equitable and sustainable and that it should be sufficient for subsistence and sustainable economic activity. The provision of sanitation services must be undertaken in a manner consistent with the broader goals of water resource management. This project is in line with the Act as it aims to provide sufficient sanitation services to the region in a sustainable manner.

This section serves to highlight key legislation and policy framework that has implications on the proposed activity. It must be noted that this list is not exhaustive but notes, at high level, the critical laws and policies that have been considered.

2. 1.10 National Water Act and Riparian Areas

Riparian habitat is afforded protection under the National Water Act in a number of ways. Firstly reference in the National Water Act to a watercourse includes its banks, on which riparian habitat is encountered. Riparian areas are thus afforded the same degree of protection as the river beds and channels alongside which they occur. Riparian habitat is also important in the context of resource quality objectives that are a critical part of the Act. In terms of Section 13(1) of the Act resource quality objectives must be determined for every significant water resource, and are a central part of data type specifications relating to national monitoring systems and national information systems as determined in Section 137(2) and Section 139(2) of the Act respectively. Resource quality is important in the context of riparian habitat as resource quality as defined in the Act means the quality of all aspects of a water resource and includes the character and condition of the riparian habitat. In terms of Section 26(4) of the Act, the need for the conservation and protection of riparian habitat must be taken into account in the determination and promulgation of regulations under the Act.

2.1.11 National Heritage Resources Act

In terms of Section 38 of the Heritage Resources Act (Act No 25 of 1999), a Heritage Impact Assessment has to be undertaken for the following developments:

- Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent; or
- Involving three or more divisions thereof which have been consolidated within the past five years; or
- The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- The re-zoning of a site exceeding 10 000 m^2 in extent; or
- Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

2.1.11.1 Heritage Management

The National Heritage Resource Act (Act No. 25 of 1999) was introduced to ensure protection of South Africa's important heritage features. As such the act covers 4 billion years of history. The act covers the following areas of heritage value:

- Archaeology;
- Paleontology;
- Meteorites.

All the above mentioned materials that are discovered are thus property of the state. Tools used to conserve and manage these resources are the formal regulated EIA processes as well as permits issued by the South African Heritage and Resources Agency (SAHRA) to restrict and/or regulate development within a heritage environment.

2.1.12 Occupational Health and Safety

The Occupational Health and Safety Act of 1993 is South Africa's principle legislation concerning health and safety of employees. It also aims to protect persons who are not at work against hazard to health and safety arising out of or in connection with the activities of a person at work. The Act places the responsibility on the employer to ensure a safe and healthy working environment and to cause every

employee to be made conversant with health and safety requirements relevant to their work. At the same time the Act places the responsibility on the employee to follow its employer's health and safety procedures and instructions. A number of Regulations have been promulgated under the Act including the following:

- General Administrative Regulations, 1994;
- Regulations for Hazardous Chemical Substances, 1995;
- General Safety Regulations, 1986;
- Construction Regulations, 2003.

2.1.13. National Road Traffic Act (Act 83 of 1996)

This Act is relevant if the applicant intends to transport, load, off-load or package dangerous goods as listed in SANAS Code of Practice 10228.

A Traffic Impact Assessment (TIA) is underway and results shall be incorporated into the EIA Report. A number of access points are proposed for the development, which requires approval from SANRAL, and the Department of Public works and Roads together with any road upgrades required as part of the development.

2.1.14. Development Facilitation Act (Act No. 65 of 1995)

The Development Facilitation Act (DFA) has formalized the restructuring of urban settlements and planning in South Africa. The aim of the DFA has been to expedite land development projects and to promote efficient and integrated land development. It is aimed at concluding the Reconstruction and Development Planning (RDP) Programme and to a certain extent replaces the RDP. The Act contains general principles for land developments. It provides that the municipalities must prepare their Land Development Objectives (LDOs) on an annual basis. All the regulations contained in the Development Facilitation Act, 1995 (Act 65 of 1995) contain provisions relating to public participation, creating room for communities to be involved in matters of land development in their areas. The LDOs deal with how people will gain access to basic services and the standard of the services. Since the inception of the Integrated Development Plans (IDPs), the land development objectives are addressed in the Spatial Development Framework (SDF), which could form part of the sector plans in the IDP.

Sections of the Act state that development initiatives are necessary for:

- Promoting integration in respect of social, economic, institutional and physical aspects of development;
- Promoting integrated development in rural and urban areas

- Promoting development of localities that are nearer to residential and employment opportunities;
- Optimizing the use of existing resources
- Discouraging urban sprawl and contributing to more compact cities and towns.

- Exploring land for housing development. The aim of this HSSP is to assist the municipality in fulfilling the abovementioned role assigned to it in terms of the National Housing Code.

2.1.14 Municipal Demarcation Act (Act 27 of 1998)

Demarcation objectives: The Demarcation Board determines a Municipal boundary with the objective that it must be to able to enable the municipality for that area to fulfill its constitutional obligations in line with the provision of a democratic and accountable government for communities within a specific geographic area inclusive of:

- The provision of services to the communities in an equitable and sustainable manner.
- The promotion of social and economic development.
- The promotion of a safe and healthy environment.
- Enable effective local governance.
- Enable integrated development.
- Have a tax base as inclusive as possible for the user of municipal services in the municipality.

2.1.15 Municipal Structures Act (Act 117 of 1998)

The Municipal Structures Act 1998 (Act No. 117 of 1998) provides for the establishment of municipal categories and for the appropriate division of functions and powers between these categories of municipality. A municipality has the functions and powers assigned to it in terms of sections 156 and 229 of the Constitution. They must be divided in the case of a district municipality and the local municipalities within the area of the district municipality, as set out below. A district municipality has the following functions and powers in terms of development planning:

- Integrated development planning for the district municipality as a whole, including a framework for integrated development plans for the local municipalities within the area of the district municipality, taking into account the integrated development plans of those local municipalities.

Furthermore a district municipality must seek to achieve the integrated, sustainable and equitable social and economic development of its entire area by:

- Ensuring integrated development planning for the district as a whole;

- Promoting bulk infrastructural development and services for the district as a whole;
- Building the capacity of local municipalities in its area to perform their functions and exercise their powers where such capacity is lacking; and
- Promoting the equitable distribution of resources between the local municipalities in its area to ensure appropriate levels of municipal services within the area.

Local municipality has the functions and powers referred to in sections 156 and 229 of the Constitution excluding those functions and powers vested in the district municipality in whose area it falls.

2.1.16 National Housing Act (Act 107 of 1997)

The National Housing Act (NHA) sets out three general principles, namely: giving priority to the needs of the poor in respect of housing development; consultation with individuals and communities affected by housing development; and ensuring that housing development is economically, fiscally, socially and financially affordable and sustainable. The NHA lays down general principles applicable to housing development in all spheres of government, defines the functions of national, provincial and local governments in respect of housing development, and promotes the role of the state as a facilitator of housing development.

National government must establish and facilitate a sustainable national housing development process, provincial government must do everything in its power to promote and facilitate the provision of adequate housing in its province within the framework of national housing policy, while municipalities must take reasonable and necessary steps within the framework of national and provincial housing legislation and policy to ensure that the right of access to adequate housing is realised on a progressive basis. Section 3(2) of the NHA provides that the Minister must monitor the performance of all spheres of government in relation of housing delivery goals and budgetary goals. Section 3(4) (i) of the NHA provides that the Minister must, in relation to the duties of government, evaluate performance of the housing sector against set goals and requirements, equitableness and effectiveness.

2.1.17 Extension of Security Act of 1993

The extension of Security of Tenure Act is aimed at promoting the achievement of long term security to tenure for occupiers of land through the joint efforts of occupiers, landowners and government bodies. Through this Act, the rights of occupiers may be extended while giving due recognition to the rights, duties and legitimate interests of landowners. The long-term security of tenure is facilitated by the minister by granting subsidies:

- To facilitate the planning and implementation of development;

- To enable occupiers in need of long-term security of tenure to
- acquire land or land rights; and
- For the development of land

3. DECLARATION OF COMPLIANCE WITH THE EMPR

The Department of Local Government and Human Settlements shall be held liable and responsible for ensuring compliance with the conditions by any person acting on his/her behalf, including but not limited to, an agent, contractor, subcontractor, employee or person rendering a service to the holder of the authorization. This EMPr is a dynamic document which will be updated as required on a continuous basis to ensure environmental best practices.

4. SUMMARY OF IMPACTS ASSOCIATED WITH PROPOSED ACTIVITY

As the environmental and social impacts associated with the proposed Establishment of an Integrated Human Settlement and related infrastructure on Elandskuil Farm No.205 & 206 IP, in Ventersdorp during the construction and operational phase are well known and are typically of Medium-Low significance. The focus of the EIA has been on the potential impacts associated with the construction and operational phases of the Integrated Human Settlement and related infrastructure in Ventersdorp. On-site and off-site impacts can be induced during the construction phase and later during its operation. On-site impacts result from construction activities carried out within the construction site. The impacts of off-site work result from activities carried out outside the construction site yet are directly related to the project. The soil, surface and ground water are the potential receptors of pollution during the construction and operation of the Integrated Human Settlement.

4.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): PLANNING PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
General compliance reporting			
EMPr will be made binding on the developer, the design team, contractors and subcontractors working on the site.	The special conditions of the contract must include provision for the strict adherence to and compliance with this EMPr as well as the general and specific conditions from the Local Authority. The Developer must appoint an Occupational Health and Safety officer (OHSO) and Environmental Consultant/Environmental Control Officer to oversee the safety, health and environmental aspects of the project respectively. The OHSO and ECO must form part of the project management team and must attend all project meetings. An environmental awareness plan should be in place prior to the construction phase. The design layout of the development should take into consideration all recommendations from specialist's reports, conditions in this EMPr, allocated buffer zones for sensitive environments. The storm water management plan for the development should be compiled.	Developer	Once off

4.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): PLANNING PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
PLANNING			
	An environmental awareness plan should be in place prior to the construction phase. The design layout of the development should take into consideration all recommendations from specialist's reports, conditions in this EMPr, allocated buffer zones for sensitive environments. The storm water management plan for the development should be compiled.	Developer	Once-Off
Alignments that would interfere with existing and potential future Infrastructure and services	Minimise alignments that would interfere with existing and potential future and services. Construction related disturbances will be kept to a minimum. Consult with the community regarding impacts on access to site and foreseeable disruptions on infrastructure.	Developer	Once off
Compliance with Environmental Legislation, guidelines, by laws and other applicable policies	The planning and design of the integrated human settlement, should take into account, and comply with all relevant environmental legislation and policies as detailed in of this report. At least a 50m buffer should be allowed from the edge of the wetland and the watercourse. No development should occur on the buffer area or sensitive area.	Developer	Once off

4.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): PLANNING PHASE

POTENTIAL IMPACTS	MITIGATION MEASURE	RESPONSIBILITY/MONITORING OF MITIGATION MEASURE	FREQUENCY
Topography & Visual Aspects	The removal of large tracts of vegetation can drastically alter the appearance and character of a community. Design and sitting of the integrated human settlement will result in an alteration of the site topography. The study area has an average height of 1465 meters above sea level and is dominated by gentle sloping hills and a few water courses all draining south towards the Skoonspruit River. The analysis of the topographical survey revealed the following slope characteristics of the two land parcels proposed for development: *Elandskuil No. 205 IP* • Gentle to fair slopes sloping in a south westerly direction on the portion located west of the R30 and gentle to fair slopes sloping in a south easterly direction on the portion located east of the R30. • A maximum slope of 1:23 was encountered on the southern edge of the portion located east of the Fair slopes all sloping in a south easterly direction towards the Skoonspriut River. *Elandskuil No. 205 IP* • A Maximum slope of 1:10, 5 was encountered on the south eastern edge of the portion. • Maximum slopes of both portions can be deemed developable.R30 adjacent to the railway line.	Developer	Once off

4.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): PLANNING PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
Bulk Services	The Engineering Service Investigation Report attached in Appendix G5 has outlined that the Municipality have enough capacity to carter for the new development except of the sewerage that will need to be upgraded.		
Stormwater	Increased stormwater can cause severe damage in terms of erosion and pollution. Infrastructure should be planned and designed in such a way as to take increased stormwater runoff in consideration. Increased stormwater can cause severe damage in terms of erosion and pollution. Infrastructure should be planned and designed in such a way as to take increased stormwater runoff in consideration. -To protect all property and life from damage associated with the flooding of streams and rivers, the "National Water Act 36 of 1998" under Part 3 of Chapter 14 all township development layouts should have 1:100 year flood line parameters. -The storm water reticulation network should be designed to follow the contour formation of the internal road network with draining the area via kerb inlets along the road. -Storm water reticulation design and construction of storm water infrastructure should ensure that overall development of the study area does not increase the rate of storm water runoff above that which the natural ground can safely accommodate at any point in the sub-catchments thus post development runoff should be equal or less than the pre-development runoff.	Developer	Once off

4.1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): PLANNING PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	-retention pond(s) will be required to act as a flood control measure to attenuate peak storm water runoff into natural water courses. -Areas of ecological value such as wetlands and rivers of the site could be sensitive to any alteration of localised drainage patterns. The introduction of roads and impermeable areas of hard standing could increase rates of run-off and therefore the risk of localized flooding and contamination.		
Appointment of irrelevant people who might fail to meet the set objectives for the proposed project	The project managers together with the appointed professionals will ensure that the correct planning has been put into place by appointing all relevant expects to tackle different tasks involved in the proposed project	Developer	Once off

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
SITE CLEARING			
Site clearing must take place in phased manner, as and when required.	Areas which are not to be maintained within two months time must not be cleared to reduce erosion risks. The area to be cleared must be clearly demarcated and this footprint strictly maintained. Spoil that is removed from the site must be removed to an approved spoil (i.e. building rubble, stripped vegetation, etc) site or	Contractor &ECO	Prior to moving to site

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	licensed landfill site. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include wetland and steep areas.		
SITE ESTABLISHMENT			
Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site.	All no go areas, within and outside of the boundary should be indicated and the personnel on site should be made aware of such areas. Appropriate signage must be placed on site for the public to be aware of the construction activities. The site camp should not be located on any inclined slopes. The construction camp should have waste storage areas. Sufficient space to accommodate all other equipment's required or to be used for the construction activities should be available.	Contractor & ECO	Prior to moving to site
CONSTRUCTION TRAFFIC AND ACCESS			
Sound environmental principles must be followed whilst establishing access to the site.	Temporary access roads that might be required must be rehabilitated prior to the contractor leaving the site. Strategic positioning of entry and exit points to ensure as little impact/ effect as possible on the traffic flow. Developing access routes may require vegetation clearing; however this exercise must be monitored by the Engineer and ECO for the duration of the project. Their permission must therefore be acquired prior to commencing with developing access routes. Access route must be single track and the same access route is to be used by all construction related vehicles. No additional parallel routes or tracks may be created. Agreed turning areas for construction vehicles must be formalised and used by the Contractor. No turning manoeuvres other than at designated places should be permitted.	Contractor &ECO	Prior to moving to site
Road maintenance	The contractor should ensure that access roads are maintained in good condition	Contractor, Project Manager	Prior to moving

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	by attending to potholes, corrugations and storm water damage as soon as these develop. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.		to site
Construction Traffic	Construction routes must be clearly defined. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. The construction trucks routes and times of operation should be carefully planned. Wheel washing and damping down of un-surfaced roads must be implemented to reduce dust. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. • Servicing must be done off-site. • Oil changes must take place on a concrete platform or on a drip tray. • Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels. • Temporary access roads that might be required must be rehabilitated prior to the contractor leaving the site. • Strategic positioning of entry and exit points to ensure as little impact/ effect as possible on the traffic flow. • The main routes to the site must be clearly signposted.	Contractor, Project Manager	Prior to commencement of construction works
General	The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labeled as to their potential hazards according to specifications. All the required safety labeling on the containers and trucks used shall be in place. The contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labeled as to	Contractor/ECO	Throughout the project duration

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	their potential hazards according to specifications. All the required safety labeling on the containers and trucks used shall be marked.		
CONSTRUCTION CAMP			
Careful planning of the setting up of construction Camp to ensure that time and costs associated with environmental management and rehabilitation is reduced.	Choice of site for the contractors' camp requires the ECOs permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones and slip / unstable zones. A site plan must be submitted to the ECO and project manager for approval. The construction camp may not be situated within the 1:100 year flood line or on slopes greater that 1:3. If the contractor chooses to locate the camp site on private land, he must get prior permission from both the project manager and the landowner. The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction). The contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. No development, or activity of any sort associated with camp, is allowed below the 1:100 year flood line of any water system.	Contractor &ECO	Prior to commencement of constriction works
Storage of materials (including hazardous materials)	Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary. Storage areas must be designated, demarcated and fenced. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons. Fire prevention facilities must be present at all storage facilities.	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	• Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be sited away from drainage lines in a site with the approval of the ECO. • These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources. • Clear signage must be placed at all storage areas containing hazardous substances / materials. • Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. • A Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at DWS licensed landfill sites designed to handle hazardous wastes. A disposal certificate must be obtained from the Waste Disposal. • The Contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. • Any spillage, which may occur, shall be investigated and immediate		

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	action must be taken. This must also be reported to the ECO and DWS, as well as local authorities if so required.		
Drainage of construction camp	Run-off from the camp site must NOT discharge into neighbours' properties or into adjacent wetlands, rivers or streams.	Contractor/ECO and the Engineer	Daily
End of construction	Once construction has been completed on site and all excess material has been removed, the storage area shall be rehabilitated. If the area was badly damaged, re-seeding shall be done. Such areas shall be rehabilitated to their natural state. Any spilled concrete shall be removed and soil compacted during construction shall be ripped, leveled and re-vegetated. ✓ Only designated areas must be used for storage of construction materials, soil stockpiles, machinery and other equipment. Specific areas must be designated for cement batching plants. Sufficient drainage for these plants must be in place to ensure that soils do not become contaminated. The construction camp must be kept clear of litter at all times. Spillages within the construction camp need to be cleaned up immediately and disposed of in the hazardous skip bin for correct disposal. No open fires are allowed within the construction camp and no wood from surrounding vegetation may be used to create a fire.	Contractor &ECO	Weekly
ENVIRONMENTAL EDUCATION AND TRAINING			
Environmental Education should be conducted for Site Staff. These points need to be made clear to staff on site before the	The ECO is to ensure that all site personnel have a basic level of environmental awareness training. Topics to be covered should include: ✓ What is meant by "Environment" ✓ Why the environment needs to be protected and conserved ✓ How construction activities can impact on the environment	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
project begins.	✓ What can be done to mitigate against such impacts ✓ Awareness of emergency and spills response provisions ✓ Social responsibility during construction of the houses e.g. being considerate to local residents It is the contractors responsibility to provide the site foreman with Environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. ✓ Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary. ✓ Use should be made of environmental awareness posters on site. ✓ The need for a "clean site" policy also needs to be explained to the workers. ✓ Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.		
Monitoring of environmental training	The contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules. ✓ No alcohol / drugs to be present on site. ✓ No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel).	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	✓ Prevent excessive noise. ✓ Prevent unsocial behavior. ✓ Bringing pets onto the site is forbidden. ✓ No harvesting of firewood from the site or from the areas adjacent to it. ✓ Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g.: fires for cooking; the use of surrounding bush as a toilet facility is forbidden). ✓ Trespassing on private / commercial / traditional properties adjoining the site is forbidden. ✓ Driving under the influence of alcohol is prohibited. ✓ Other than pre-approved security staff, no workers shall be permitted to live on site.		
TOP SOILS			
The stripping of vegetation during preliminary activities on site may increase the risk of soil erosion	The contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas. Care must be taken not to mix topsoil and subsoil during stripping. Removed polluted topsoil should be transported to a licensed landfill site.	Contractor &ECO	Weekly
Soil Stripping	No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation. Subsoil and overburden should, in all construction and lay down areas, be stockpiled	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	separately to be returned for backfilling in the correct soil horizon order. Construction vehicles must only be allowed to utilise existing tracks or pre-planned access routes.		
Stockpiles	Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels. Stockpiles should not exceed 2m in height. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. Where contamination of soil is expected, analysis must be done prior to disposal of excess soil to determine the appropriate disposal route.	Contractor & ECO	Weekly
Fuel storage	Topsoil and subsoil to be protected from contamination. Fuel and material storage must be away from stockpiles. Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflows into the soil. Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. Contaminated soil must be contained and disposed of offsite at an approved landfill site.	Contractor & ECO	Weekly
Earthworks	Soils compacted during the construction should be deeply ripped to loosened compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas. The contractor should be re-vegetated upon completion of construction activities.	Contractor	Weekly
EROSION CONTROL			

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
The stripping of vegetation during preliminary activities on site may increase the risk of soil erosion.	Wind screening (i.e. erection of barriers, shade nets etc) and storm water control (i.e. gabions, sandbags etc) should be undertaken to prevent soil loss from the site. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion. Other erosion control measures that can be implemented are as follow: ✓ All erosion control mechanisms need to be regularly maintained. ✓ Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. ✓ Retention of vegetation where possible to avoid soil erosion ✓ Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. ✓ Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed. ✓ No impediment to the natural water flow other than approved erosion control works is permitted. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion. ✓ where necessary and according to slope and risk in terms bank erosion , disturbed areas of riparian zone should be re-vegetated using either a specified seed mix or appropriate indigenous trees. ✓ The use of hay bales packed in rows across diversion and active flow areas during construction should be used to limit sediments input in rivers.	Contractor &ECO	Weekly
GROUNDWATER AND SURFACE WATER POLLUTION			
Water quality is affected by	• Sanitation Adequate sanitary facilities and ablutions must be provided for	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
the incorrect handling of substances and Materials. Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.	construction workers. • The facilities must be regularly serviced and emptied to reduce the risk of surface or groundwater pollution. • No water should be abstracted from any water resource for the purpose of construction activities without a water use license Stockpiling of soil should be done at designated areas as agreed by the contractor and ECO • Soil erosion and loss measures should be implemented. • Construction activities should be limited to the footprint of the proposed development. • Mixing of cement must take place on impervious surfaces. • Regular construction vehicle's checks prior to being used or during their standing period should be done in order to limit or avoid soil contamination. • No servicing of construction vehicles must take place within the site, to avoid soil contamination with hydrocarbons or oils. • Chemical portable toilets provided by contractors must be maintained for the duration of the construction phase. • Water conservation should be promoted by use of water saving technologies. • The portion of the Skoonspruit River and its tributary located within the study area must be designated as sensitive areas and no development should take place within these features or their allocated buffer zones.		

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	Should any activities take place within the allocated zones of regulation, authorisation will be required in terms of the NWA and NEMA. The layout for the proposed development needs to be amended in order to avoid development within the buffer zone and regulated zones		
Hazardous materials	• Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential storm water events. • Any hazardous substances must be stored at least 20m from any of the water bodies on site. The Environmental Control Officer should be responsible for ensuring that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry. • Contaminated wastewater must be managed by the contractor to ensure existing water resources on the site are not contaminated. • All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.	Contractor &ECO	Weekly
Public areas	Food preparation areas should be provided at the construction camp with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis. The contractor should take steps to ensure that littering by construction workers does not occur and persons	Contractor & ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines. No washing or servicing of vehicles on site.		
Water resources	Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the ECO) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. The Department of Water and Sanitation and the ECO as well as other Emergency contact numbers provided by the Municipality should be contacted in order to deal with spillages and contamination of aquatic environments. Proper compaction of backfilled material to attain low permeability. Ensure that surface/storm water is diverted away from excavation trenches If necessary ensure that stream flow bypasses the construction area within drainage lines. Shape backfilling of trench in such a way that water ponding and erosion of backfilled trench are avoided. Ensure that contaminants are safely stored and away from the construction site. Silt traps should be installed in the stretch of the two rivers downstream of the construction works to trap any silt that is mobilised by the construction activities. Water in the river channel that needs to be pumped around the construction site and discharged back into the river, this must be done with care must be taken to ensure that water is discharged in a manner that does not cause siltation or erosion into the wetland or downstream watercourse.	Contractor & ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
STORMWATER			
Construction activities Frequently result in diversions of natural water flow resulting in concentration of flow and an increase in the erosive potential of the water. Measures in this section are aimed at reducing the erosive potential of storm water.	The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. Silt fences should be used to prevent any soil entering the storm water drains. Temporary cut of drains and berms may be required to capture. Storm water and promote infiltration. Promote water saving mind set with construction workers in order to ensure less water wastage. New storm water infrastructure construction must be developed strictly according to specifications from ECO in order to ensure efficiency. Hazardous substances must be stored at least 20m away from the buffer area surrounding any water bodies on site to avoid pollution. The installation of the storm water system must take place as soon as possible after commencement of the construction activities, to attenuate storm water from the construction as well as the Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water path ways over the site. (i.e. these materials must not be placed in storm water channels, drainage lines or rivers).	Contractor/ECO& Project Manager	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.		
AIR QUALITY DUST AND ODOUR			
Dust control. Main causes of air pollution are dust from vehicle movements and stockpiles, vehicle emissions and fires.	• Chemical toilets should be cleaned and serviced weekly depending on usage or as required. • Fires should not be allowed on site to avoid emissions into the surrounding ambient air. • All surfaces that are not paved and generate dust should be sprayed using a water tank continuously, or other environmentally friendly dust suppressing agents can be used to limit the generation of dust. • Vehicular speed to the construction site should be regulated, in order to limit the generation of dust on houses along the access route to site. • Any rubble generated during construction shouldn't be left on site for more than two weeks as it will become susceptible to wind action. • Unnecessary movement of construction vehicle must be avoided.	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	• Vehicles that will be transporting building materials such as sand or rubble need to be covered or wet down to avoid the material being blown by air during windy conditions. • The topsoil removal must be done in a phased manner so that large areas of unconsolidated soils are avoided. • A register must be made available for reporting any excess dust from construction activities. • Any remedial action taken in relation to a complaint must be communicated to the complainant.		
Fire prevention	✓ No Fires may be made on site. ✓ Burning of waste on site is prohibited. ✓ Compliance reports must be compiled regularly by CO and OHSO to ensure full compliance with the EMPr. ✓ The site must be equipped with firefighting equipment which will include; 1. Flame arresters 2. Water sprinklers 3. Gas/ Fire detection equipment	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	4. Nitrogen and carbon dioxide blanketing equipment 5. Foam spraying • The fire-fighting equipment should be satisfactory to the Local Fire Authority • Key personnel should be allocated to manage fire emergencies.		
NOISE			
It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work and increase costs in the form of delays.	The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of residential areas in close proximity to the development. Construction site yards, workshops, and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor, the sites must be evaluated in detail and specific measures designed into the system. Truck traffic should be routed away from noise sensitive areas, where possible. ✓ Noise levels must be kept within acceptable limits. ✓ Noisy operations should be combined so that they occur where possible at the same time. ✓ Blasting operations (if required) are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day should be limited, blasting should be undertaken at the same times each day and no	Contractor ,ECO& Project Manager	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	blasting should be allowed at night. ✓ Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas should not be allowed. ✓ With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor and ECO should liaise with local residents on how best to minimise impact, and the local population should be kept informed of the nature and duration of intended activities. ✓ As construction workers operate in a very noisy environment, it must be ensured that their working conditions comply with the requirements of the Occupational Health and Safety Act (Act No 85 of 1993). Where necessary ear protection gear should be worn. ✓ Noisy activities to take place during allocated construction hours only as per section 25 of the Noise Control Regulations of the Environment Conservation Act, 1989 (Act No. 73 of 1989) ✓ Noise from labourers must be controlled. ✓ Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site. ✓ The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall	Contractor & ECO	

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	be transported to and from the site by the contractor own transport. ✓ Signage informing the public of construction activities should be erected on site.		
VISUAL IMPACT			
	• The site must be screened off by use of fence with shade cloth. • Construction camps and stockyards should be located out of the visual field of highly sensitive visual receptors such as residents. • The construction sites and camps should be kept neat, clean and organised in order to portray a general tidy appearance. • Rubble and other building litter should be removed off site as soon as possible or placed in a container in order to keep the construction site free from additional unsightly elements; • Dust suppression measures should be implemented; this includes regulating speeds along access routes to site.	Contractor & ECO	Weekly
FLORA			
Alien plant encroachment is Particularly damaging to natural habitats and is often Associated with disturbance to the soil during construction activities. Care Must be taken to conserve existing plant and animal life on and surrounding the	During the construction phase workers must be limited to areas under construction and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated ("no-go" areas during construction activities. The site should be fenced prior to construction activities and remain fenced off. Collection of firewood and traditional medicinal plants is strictly prohibited. No area should be cleared of trees, bushes and other vegetation for the purpose of a camping site. The construction could result in limited opening-up of the vegetal cover during the construction phase. The opening up of existing vegetated areas, thereby creating	ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
site.	corridors along which animals can move, may result in increased predation levels on small mammals, reptiles, amphibians, arachnids and scorpions along these corridors. The limitation of the disturbance of vegetation cover as well as rocky outcrops, logs, stumps, termite mounds within sensitive areas will ameliorate this impact. ✓ Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. ✓ Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. ✓ The pipes should be designed to allow access for appropriate necessary maintenance; the appropriate agency should implement an ongoing monitoring and eradication programme for all invasive and weedy plant species growing around the proposed bridge upgrade areas. ✓ The disposal of vegetation on neighbouring properties is prohibited ✓ All cleared vegetation should be disposed off at a licensed landfill site. Burning of vegetation is prohibited on site.		
Rehabilitation	Any post-development re-vegetation or landscaping exercise should use species indigenous to South Africa. Where the removal of alien species may leave spoil exposed, alternative indigenous species should be established before eradication takes place. All damaged areas as a result of construction shall be rehabilitated upon completion of the contract in accordance with ECO satisfaction. Slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. Extra seed shall be sown on disturbed areas as directed by the ECO. Other	Contractor &ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	methods of rehabilitating disturbed sites may also be used at the discretion of the Project Manager to comply with the conditions of the EMP, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slopes. The type of soil shall also be taken into consideration. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. Fragmentation must be kept to a minimum. ✓ Rehabilitation must take place as soon as construction is complete to avoid the edge effect, the infiltration of alien species and soil erosion within the servitude. ✓ Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for reseeding Demarcation of construction area ✓ The construction area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint. ✓ Signposts must be erected in areas which are identified by the ECO as being ecologically sensitive and which are adjacent to any construction work to prevent damage by labour and equipment. ✓ These areas must be demarcated with branded tape to limit access and indicate to construction staff that these areas are sensitive. ✓ Only vegetation within the construction area must be removed. ✓ Vegetation removal must be phased in order to reduce impact of construction. ✓ The construction site office and lay down areas must be clearly		

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	demarcated and no encroachment must occur beyond demarcated areas. ✓ Construction areas must be well demarcated. ✓ Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. Sensitive area mitigation measures ✓ Intensive environmental compliance monitoring must be conducted during this construction period.		
FAUNA			
	A barrier either preferably concrete or galvanized sheeting that extends as a continuous sheet above ground for at least 40cm and below ground for at least 30cm that will physically block animals from accessing the site to be constructed for a distance of 200m on either side of all aquatic and terrestrial underpasses. - The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. - Care should be taken when removing stumps, logs or rock material. Any scorpions encountered on the site should be left alone and allowed free access	ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	away from the activity or safely removed from the area. No scorpions should be intentionally killed. -Snakes should not be harmed or killed and allowed free movement away from the area. Safety precaution measure must be implemented especially during the vegetation clearance phase which could result in encounters with several venomous snake species. - The frequent burning of the vegetation will have a high impact on remaining reptile species. Fires during the winter months will severely impact on the hibernating species, which are extremely sluggish. Fires during the early summer months destroy the emerging reptiles as well as refuge areas increasing predation risks. All necessary mitigation measures must be implemented to minimise impacts on the environment.		
SENSETIVE HABITAT	Areas identified by the Engineer or the ECO as being ecologically sensitive and adjacent to any construction work are to be suitably demarcated to help prevent damage by plant and labour. Temporary fencing/ demarcation should be used and should be moved in phases as the construction progresses from one area to	ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	the next.		
WETLANDS			
This section deals with the impact that the construction will have on wetlands and other surface water features in the study area)	-Where possible, construction activities should occur during dry (winter months) when water levels and seepage in wetlands / rivers are lower. -Silt traps / silt curtains must be installed in the stretch of the two rivers downstream of the construction works to trap any silt that is mobilised by the construction activities. After construction, the silt and the traps / curtains are removed from the river bed. -Water discharged from pumping around the construction area or from dewatering operations is first discharged into a structure that allows the settlement of all suspended material, and which allows the diffuse discharge of water into the wetland close to the banks of the river. -Disturbance to any wetlands during construction should be minimized. Underpasses should be accessible to maintenance staff and should be cleared of accumulated material at least at the start of each rainy season. -Should cement mixing need to occur within the boundaries of the wetland, this should be done on impervious lined material. Any spillage of cement must be immediately cleared up. All disturbed river banks should be suitably rehabilitated and protected with a geo-textile or similar material to protect reinstated topsoil and any re-seeded vegetation. ✓ The construction footprint in the wetlands should be kept as narrow as possible to ensure that the smallest area of wetland possible is potentially impacted. Disturbance to any wetlands during construction should be minimized.	ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	Underpasses should be accessible to maintenance staff and should be cleared of accumulated material at least at the start of each rainy season. -Should cement mixing need to occur within the boundaries of the wetland, this should be done on impervious lined material. Any spillage of cement must be immediately cleared up.		
Erosion Control	Where possible, silt fences / barriers or other relevant measures should be installed along the edge of streams and wetlands to prevent soil erosion and ingress of runoff water carrying silt from the catchment of the wetland (i.e. the slopes surrounding the wetland) to enter the water body.	Contractor/ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
Trenching	Where trenching is done, soils removed must be returned in the same order as they were removed to reinstate any subsurface layering of the profiles. Topsoil should be stored on and covered by a geo-textile membrane. Each subsequent soil horizon must be stored separately on a geo-textile membrane. These soil horizons must be returned in the order they were taken out.	Contractor/ECO	Weekly
WASTE MANAGEMENT			
Set up of Waste Management Procedures. Construction rubble.	Construction rubble shall be disposed of in pre – agreed, demarcated spoil dumps that have been approved by the relevant Municipality. All building rubble must be removed to a registered landfill site.	Contractor/ECO	Weekly
Litter management	Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. Waste disposal will need to take place in terms of Section 20(6) of the Environmental Conservation Act (Act No. 73 of 1989). Subject to the provisions of any other law no person shall discard waste or dispose of it in any other manner, except- (a) at a disposal site for which a permit has been issued in terms of subsection (1); or (b) In a manner or by means of a facility or method and subject to conditions as the Minister may prescribe. In addition, notice should also be taken of the provisions contained in the NEM: Waste Management Act. -If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be	Contractor/ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	appointed to conduct this recycling. -Littering by the construction workers shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the contractor campsite. -Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly form the site by the local council. -All waste must be removed from the site and transported to a landfill site as approved by the relevant Municipality. Waybills providing disposal at each site shall be provided to the ECO's inspection.		
Hazardous waste	All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site. Contaminants to be stored safely to avoid spillage Machinery must be properly maintained to keep oil leaks. -Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. -The ECO must determine the precise method of treatment of polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials. -If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. Materials used for the remediation of petrochemical spills must	Contractor/ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	be used according to product specifications and guidance for use. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.		
Sanitation	The contractor shall install mobile chemical toilets on the site. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. Ablution facilities shall be within 100m from workplaces but not closer than 50m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce. Male and females must be accommodated separately where possible. -Toilets should be no closer than 100m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the ECO. Potable water must be provided for all construction staff.	Contractor	Weekly
HEALTH AND SAFETY			
Workers safety is of outmost importance Implementation of safety measures, work procedures and first aid must be implemented on site.	Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993) is required to ensure worker safety. Workers should be thoroughly trained in using potentially dangerous equipment. Must ensure that all equipment is maintained in a safe operating condition. ✓ A safety officer must be appointed. ✓ A record of health and safety incidents must be kept on site. ✓ Any health and safety incidents must be reported to the project manager immediately.	Contractor, Project Manager , and ECO	Daily

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	✓ First aid facilities must be available on site at all times. Workers have the right to refuse work in unsafe conditions. ✓ A record shall be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against the contractor. ✓ The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. ✓ Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers.		
Worker facilities	Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness Fires are not to be allowed.	Contractor, Project Manager Department of Local Government and Human Settlements and ECO	Daily
Protective gear	Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc. No person is to enter the site without the necessary PPE positions.	Contractor & Department of Local Government and Human Settlements	Daily
Site safety	The construction camp (if required) must remain fenced for the entire construction period. -Potentially hazardous areas such as trenches are to be demarcated and clearly marked. -Adequate warning signs of hazardous working areas. -Uncovered manholes and excavations must be clearly demarcated	Contractor, Project Manager , Department of Local Government and Human Settlements and ECO	Daily

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	-Emergency numbers for local police and fire department etc must be placed in a prominent area. -Firefighting equipment must be placed in prominent across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. -Suitable conspicuous warning signs in English and all other applicable languages must be placed at all entrances to the site. All speed limits must be adhered to.		
Hazardous Material Storage	Staff that will be handling hazardous materials must be trained to do so. Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. The bund walls for the transformer oil containers must be in place before the installation of these containers. The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practise must be adhered to. This applies to solvents and other chemicals possibly used in the construction time.	Contractor, Project Manager , Department of Local Government and Human Settlements and ECO	Daily
Procedure in the event of a petrochemical spill	The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, ECO or the contractor. The problem must be assessed and the necessary actions required will be undertaken. The immediate response must be to contain the spill. The source of the spill must be identified, controlled, treated or removed.	Contractor &ECO	Daily
Fire management	Firefighting equipment should be present on site at all times as per OHSA. All	Contractor, Project Manager ,	Daily

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	construction staff must be trained in fire hazard control and fire fighting techniques. All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. No open fires will be allowed on site.	Department of Local Government and Human Settlements and ECO	
SECURITY			
Secure the site in order to help reduce the opportunity for criminal activity in the locality of the construction site.	Access to the construction site should be strictly controlled by a security company. 24 hour security on-site. No person shall enter the site unless authorised to do so by the contractor, project manager or ECO. If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed with the landowner in writing. Trespassing on private / commercial properties adjoining the site is forbidden. Secure the site in order to reduce the opportunity for criminal activity in the locality of the construction site	Contractor	Daily
SOCIO-ECONOMIC			
It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work and increase costs in the form of delays.	All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings. During the set up phase of the project, the Contractor needs to make contact with the PSC and the people that are interested or affected by the development (IAPs). The Contractor should appoint a Community Liaison Officer or the ECO is to deal with all social issues. The Contractor must obtain the landowners permission to remove any fence, and infringe on any property.	Contractor, Project Manager , Department of Local Government and Human Settlements and ECO	Weekly

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	✓ No interruptions other than those negotiated shall be allowed to any essential services. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the contractor. A record of all damage and remedial actions shall be kept on site. Influx of Job Seekers. ✓ Ensure that employment procedures / policy are communicated to local stakeholders, especially community representative organisations and ward councilors. ✓ Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags. Outflow of labourers ✓ Payment should comply with applicable Labour Law legislation in terms of minimum wages. Direct formal employment opportunities ✓ Unskilled job opportunities should be afforded to local residents. Local trade unions could assist with the recruitment process to counteract the potential for social mobilisation. ✓ Equal opportunities for employment should be created to ensure that the local female population also has access to these opportunities. Females should be encouraged to apply for positions.		
CULTURAL ARAND HERITAGE ARTEFACTS			
Prior to the commencement of construction, the ECO should notify staff what	Any findings must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999). Local museums as well as the South African Heritage Resource	Contractor/ECO	Prior to commence with construction

4.2. IMPACTS DURING THE CONSTUCTION PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
possible archaeological or historical objective of value may look like, and to immediately notify the Engineer / Contractor should such an item be uncovered.	Agency (SAHRA) should be informed if any artefacts are uncovered in the affected area. The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from the South African Heritage Resources.		works

4.3. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE

This EMPr aims to provide mitigation measures, however the operational phase for the proposed development will solely rely on the maintenance to be carried out by the applicant and its relevant officials in accordance with its by-laws and maintenance plan.

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
BIODIVERSITY			
Avoid tempering with Flora and Fauna.	Indigenous vegetation must be maintained on the servitude on an annual basis and all exotics removed as they appear and disposed off appropriately. No fauna and flora species must harmed by maintenance staff during any routine checks of the infrastructure.	Department of Local Government and Human Settlements	Annually
STORM WATER IMPACTS			

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
Erosion of surrounding banks due to storm water. Hardened surfaces, as opposed to undeveloped areas natural vegetation, will lead to an increase in runoff, which in turn may lead to increased pressure being exerted on the camp's stormwater control system.	Storm water control measures will need to be implemented to ensure run off from the road and footpath does not cause erosion to the surrounding environment. All storm water should be directed to the dam or surrounding vegetative environment via storm water channels or pipelines without the possibility of sediment being picked up or structural damage to the river/dam banks occurring. Impermeable surface will be replaced by a permeable surface, leading to the reduction of storm water runoff.	Department of Local Government and Human Settlements	Annually
Uncontrolled storm water runoff and potential associated with soil erosion.	Evidently, continuous trampling reduces the ability of the soil to recover, due to the decrease in abundance of active roots.	Department of Local Government and Human Settlements	Annually
IMPACTS ON FLORA			
The ecological characteristics of the land development area and its surrounding. Habitat fragmentation and negative impact on the functional contribution to the larger ecosystem Increase and spread of exotic invader	Disturbance of mammals, wildlife birds, reptiles, other animals and their habitat must be prevented. Protected indigenous fauna will not be destroyed. Introduce and maintain indigenous vegetation where possible in line with landscaping plan. Appropriate indigenous vegetation will be planted around the site. Where trees and other vegetation have had to be removed, these must be re-planted.	Department of Local Government and Human Settlements	Annually

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
species habitat destruction			
IMPACT ON FAUNA			
Impact on fauna	Litter storage is to be of the highest standard and out of reach of primates and other animals. Movement corridors for arboreal-inhabiting fauna should be created through the planting of trees adjacent to one another where space allows.	Department of Local Government and Human Settlements	Annually
AIR POLLUTION IMPACTS			
Air Pollution Impacts. Wood Smoke. Motor Vehicle.	A primary source of wood smoke is from the houses. Wood smoke is composed of fine particulates. The residence must be educated on the potential impacts on the usage of diesel generators for cooking as backup and their usage must be prohibited, once there is load shedding it is recommended that solar and gas stoves be installed to minimize possible contribution to air pollution	Department of Local Government and Human Settlements.	Annually
IMPACTS ON WATER AND POLLUTION			
Impact on water and pollution	The sewer reticulation networks infrastructure will be properly maintained on ongoing basis on the Integrated Human Settlement Groundwater contamination is a specific concern for the aquifer. Potential threats to the aquifer include failing reticulation pipes, storm water runoff from roads and fuel leaks. These impacts can be reduced through pollution prevention and storm water management plans. Groundwater concerns focus on pollution caused by hazardous household wastes, solid waste disposal and increased impervious surface runoff that result from increased urban development. Infiltration of septic tank and urban runoff and other waterborne pollutants may pollute groundwater. This requires small municipal, separate storm sewer system operators to follow six minimum control measures to meet the requirements. Storm water management standards that require on-site storm water control and treatment limit post development storm water peak flows. This can reduce impacts	Department of Local Government and Human Settlements	Annually

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	to surface water quality and stream channels. Water Resource Management at the Integrated Human Settlement is imperative. Water-saving devices must be installed in all kitchens and bathrooms in all the buildings. This includes the installation of dual flush toilets. Toilets must be regularly checked to ensure that no water leakage occurs. The site must be landscaped in such a way that minimal irrigation of landscaped areas is required. Rainwater from the roof of the building must be captured, stored, and utilised for irrigation of landscaped areas.		
WATER LEAKAGES. Potential impacts of leaking of pipes, bursting of reticulation pipes	The material that will be used when laying reticulation pipes will be of high quality to sustain the condition of the pipes when it is in operation. The good quality uPVC pipe will be used. They will range from 400mm to 900mm diameter. Leakage of water and sewer pipes must be properly monitored in order minimise water loss and groundwater pollution.	Department of Local Government and Human Settlements	Annually
EDUCATION ON WATER CONSERVATION	The Residence must be educated about the water conservation, the showers be installed as they save water more than bath.	Department of Local Government and Human Settlements	Annually

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
WASTE MANAGEMENT IMPACT			
A lack of management with regards to solid waste collection and sanitation could lead to surface. water contamination	Should surface water be contaminated due to an incident or A lack of management with regards to solid waste collection and sanitation could lead to surface water contamination, and may attract problem animals to the Integrated Human Settlement site. Incorrectly stored waste could lead to the development of odours. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. It is recommended that policies, plans, and appropriate waste management practices for the operation of Integrated Human Settlement is published. The following waste prevention strategies should be generally	Department of Local Government and Human Settlements	Annually
Waste Disposal	All other waste must be disposed of in an environmentally responsible manner Waste disposal must be closely monitored to prevent pollution and other adverse impacts, especially of the water resources. A comprehensive waste management plan with procedures must be developed and implemented for the Integrated Human Settlement.	Department of Local Government and Human Settlements	Weekly

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
Littering	The litter and human waste left behind by the residence create sanitation on the Integrated human Settlement site. It is important to educate the residence on using the organic waste. Separate organic from inorganic waste. Organic waste may be processed and turned into compost (an excellent fertilizer for gardens). As regards inorganic waste, it is important to warn the residence and office occupants against throwing away cigarette wrappings, beer cans, plastic cups and other containers, etc. Have an area designated for smoking at the office site as well as the assembly points in case of any emergencies.	The Department of Local Government and Human Settlements	Annually
Aesthetics, Landscape Character and Sense of Place.	Waste will be properly managed to avoid aesthetic impact and the landscape of the Integrated Human Settlement will be appealing, grass and pavement will be developed. Maintaining cleanliness around and within the Integrated Human Settlement site & Proper fencing and landscaping will be enforced.	The Department of Local Government and Human Settlements	Annually
Fire Impacts.	Designated smoking area and provision for disposal of cigarette remains at all the offices and schools. There should be designated cooking and smoking areas at the school sites.	The Department of Local Government and Human Settlements	Annually
SAFETY AND SECURITY			
Maintenance, safety and security of Integrated Human Settlement	The client will ensure that the Integrated Human Settlement is well maintained. The security at the Integrated Human Settlement will be beefed up as more people will flock into the area All gates will be under the control of the Wardens.	The Department of Local Government and Human Settlements	Annually
SOCIO-ECONOMIC IMPACTS			

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
The socio economic impact communities in the land development area and its surrounding. Number of employment opportunities will be created during the operation phase. Where possible local people should be employed for this project. Livelihood of civilians will be improved both from a social and economic perspective. More educators will be employed.	This would be associated with a positive impact no mitigation required.	The Department of Local Government and Human Settlements	Annually
VISUAL IMPACTS			
	Minimum visual impacts would be experienced especially by road users after the construction. The location of compatible facilities will be with materials that blend with the surroundings to enhance the sense of place/character of the area. The height of structures is limited and the construction material is finished to blend into the natural surroundings. The Architectural Guidelines for the development specify the restriction of the height of the structure to single storey's and the utilisation of appropriate materials and finishes to reduce the visual impact. Non sensitive colours should be used when painting lights pole structure.	The Department of Local Government and Human Settlements	Annually

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
	The proposed project is considered to be compatible with the surrounding landscape and is not likely to impact negatively on the existing visual quality or landscape character of the area; rather it is expected to improve the general environment through better use of the area. The development of Integrated Human Settlement will enhance the sense of place of the project area (it is anticipated that the project will result in improved safety and Aesthetics).		
NOISE POLLUTION			
Noise Pollution. Air conditioning units, refrigeration compressor units and kitchen extractor fans placed on the outside of the building could create a noise impact for sensitive receptors. Noise from vehicles using the new access	Appropriate architectural design measures must be designed into the building. The architectural design consideration must be adequate in order to meet interior noise standards as specified by SANS 10103. High quality air-conditioning equipment should be installed. Equipment with the best noise rating should be used. Roof mounted fans may further require attenuators and need to be screened from noise sensitive areas. Night-time use of the facility should be kept to a minimum to ensure that no activities and regular operational activities, or movement of facility users to and from the facility disturb adjacent noise sensitive users.	The Department of Local Government and Human Settlements	Annually
ENERGY CONSUMPTION			

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR): OPERATIONAL PHASE			
POTENTIAL IMPACTS	**MITIGATION MEASURE**	**RESPONSIBILITY/MONITORING OF MITIGATION MEASURE**	**FREQUENCY**
During operation of the proposed project, additional energy will be consumed, resulting in a direct medium term increased demand on this resource. Energy efficiency resources are essential.	Electricity provision should be extended to the new facilities that would require electricity connection. The solar system will also be installed as alternative energy source during the operation of the Integrated Human Settlement. Room insulator for offices and schools should be installed to keep the rooms warm so that no heating of rooms would be needed in winter, solar geyser should be installed and water saving flush toilets should be installed. The lighting mechanism and bulbs should be the ones using low voltages. The machines to be used should be energy efficient as they use unleaded petrol which has low carbon emission. Naturally lit and well ventilated buildings, that utilise alternative energy sources and those that are designed to offer attractive whole life performance to consumers are more likely to be sound wealth investments than those which are over-dependent on fossil fuels or which ignore the fundamental human need for a healthy and engaging environment. Increasingly, the design and layout of buildings necessitate active measures to maintain conditions which ensure the health and general well-being of their occupants. The installation of lights will positively contribute much in enhancing our night-time environment but, if not properly controlled, light pollution can present physiological and ecological impacts. Use of specifically designed lighting equipment that minimizes the upward spread of light near to and above the horizontal, (i.e. use of full cut off lighting fixture) is recommended	The Department of Local Government and Human Settlements	Annually

5. IMPACT MANAGEMENT OUTCOMES

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
1.Site rehabilitation and earthworks	Dust	Air quality	Construction	When there are visible clouds of dust on the Integrated Human Settlement boundary, dust must be spurred by watering the area. All haul roads (only those being used at the time) will be watered with a water cart daily, with the exception of days when the roads are already wet as a result of rain. A speed limit of 30km/h will be enforced on all unpaved roads.
	Presence of equipment being unsightly	Visual	Construction	Implement good housekeeping practices, e.g. All raw materials must be stored in the designated areas. All waste generated must be disposed of as described below under Waste Management.
	The rubble dumps will make the land unavailable for other uses	Land use	Construction	Implement concurrent rehabilitation so that the land can be used for other purposes.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
	The presence of equipment and resources such as fuel at the site may attract would be thieves. Job seekers attracted to the area for job opportunities that may not be available and may resort to crime.	Crime and security	Construction	The entire construction area will be fenced with equipment and resources being contained within. 24 hour security will be available at the site.
	Removal of alien vegetation Promotion of establishment of indigenous species	Restoration of the construction area	Construction	Rehabilitate the footprint as far as is practicable, a state where by it can complement surrounding land use activities and does not represent a source of pollution - remove alien vegetation - promote the growth of indigenous vegetation Deep trenches and pits will be refilled with low grade rock. The entire construction area will be inspected for any signs of pollution and if identified it will be removed and disposed of in a registered landfill site. Areas compacted as a result of construction activities will be loosened to promote self-vegetation, and any ruts created by accessing or leaving the site will be filled to ensure that no future erosion shall emanate from the site.
	Those impacts associated with the behaviour of vehicles off-site. Potential impact that traffic has on the roads in the vicinity of site.	Social / traffic	Construction	No overloaded vehicles will be allowed to leave the site. Complaints regarding bad driving will be taken up directly with the drivers to increase awareness of the potential negative implications of bad driving. Any vehicle arriving to collect product, that is noted to be releasing unacceptable pollution (i.e. clouds of exhaust fumes or leaking oil), will not be

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
				allowed on-site. The driver will be informed of the reason the vehicle is being denied access and will not be allowed on-site until the necessary repairs have been undertaken.
	Destruction of a cultural / heritage artefact	Cultural / heritage	Construction	If any evidence of archaeological sites or unmarked human burials is found during construction activities, the South African Heritage Resources Agency (SAHRA) must be alerted immediately, and an accredited professional archaeologist must be called in to inspect the findings and compile a report on the findings and be submitted to SAHRA for further decision making on this matter. During this time all construction activities must be stopped.
	Loss of flora by clearing/ trampling, Loss of habitats for fauna	Ecological	Construction	A Biodiversity Assessment was undertaken to scan of the proposed Integrated Human Settlement site to confirm the presence of Threatened Ecosystems and Primary vegetation Implement recommendations from study.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
	Noise generated from vehicle / equipment operations	Noise nuisance	Construction	Operating hours will be restricted to daylight hours (8am to 5pm) only (Monday to Friday). Only maintenance activities may be undertaken on Sundays
	Pollution from hydrocarbon spills, Erosion	Soil	Construction	If erosion is identified on the site, the following corrective action must be taken: Repair erosion (fill the gully), Identify the cause of erosion (e.g. source of fast water flow), Undertake appropriate remediation to avoid further erosion, i.e. divert the flow of storm water away from the affected area. As and when spills occur, all contaminated material must be lifted and stored in containers that do not leak (the type of container will be determine by the volume of contaminated material to be stored). Dispose of contaminated material by one of the following methods: - Transportation to a bioremediation site. OR - Disposed as hazardous waste. Keep a record of the collection and disposal, ensuring the following documentation is obtained: - The bioremediation facility provides proof of acceptance and treatment. - The hazardous waste disposal company provides proof of disposal at a suitably licensed facility
	Alteration of surface water flow by changing the current topography - Hydrocarbon pollution from construction	Surface water	Construction	Ensure that activities undertaken on site comply with the requirements of GN 704 Ensure the separation of clean and dirty water areas. - Divert “clean” storm water away from the construction area via trenches / berms / diversions

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
	equipment / maintenance activities			channels (suitable to influence the natural flow of run-off). - All stormwater structures will be inspected, on a monthly basis, for damage and necessary repairs implemented within 5 days. As and when spills occur, all contaminated material must be lifted and stored in containers that do not leak (the type of container will be determine by the volume of contaminated material to be stored). Dispose of contaminated material by one of the following methods: - Transportation to a bioremediation site. OR - Disposed as hazardous waste. Keep a record of the collection and disposal, ensuring the following documentation is obtained: - The bioremediation facility provides proof of acceptance and treatment. - The hazardous waste disposal company provides proof of disposal at a suitably licensed facility
2. Operation of the Integrated Human Settlement	Impact to the local communities quality of life during this activity	Sense of place	Operational	Every effort must be made to implement the management measures in the EMP so as to manage the impacts. All complaints received by the operation must be recorded. The information recorded must include, but is not limited to: • Date of complaint • Name and contact details of complainant. • Nature / Description of the complaint. • A description as to how the complaint will be addressed. • A proposed target date for rectifying the complaint. • Date when corrective action was implemented (if necessary).

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
				• Confirmation / Explanation of feedback provided to the complainant. A list of any monitoring or follow-up work that is required, including target dates.
	Poor waste management and housekeeping being unsightly	Visual	Operational	Implement good housekeeping practices, e.g. All raw materials must be stored in the designated areas. All waste generated must be disposed of as described below under Waste Management.
	Pollution from hydrocarbon spills and other contaminants	Soil	Operational	Waste Management: Labeled bins will be provided for domestic and hazardous waste streams. Employees and learners will be made aware of the importance of appropriate waste management practices. Waste removal will be undertaken by a reputable service provider prior to the bins reaching capacity. Disposal certificates must be requested from the service provider and be kept on record. In the case of spillages or leaks, spill will be contained by preventing its spread using sand or other material on site. The spillage and any other contaminated material will be transferred into a suitable container. The container should be sealed and disposed appropriately. Vehicle Maintenance: Should maintenance work be required, a contractor will be commissioned to undertake the necessary work on-site. Drip trays must be used when carrying out maintenance activities. Any spillages that may result will be managed as described below: - How to clean

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE
				up a spill: • Contain the spill by constructing earth walls from loose soils on-site. • Cover the contained spill with an environmentally acceptable absorbent or soils. It is preferable to use an absorbent as less material is required to absorb the spill and the bioremediation action starts taking place immediately. • The polluted soil and the material used to cover the spill will then be removed from the spill site and collected in drums (that do not leak). • The drums containing the contaminated material must be covered with a lid to prevent the contents of the drum from being spilled if knocked over and prevent the containers being filled with rain water. • The drums must then be disposed of through a hazardous waste disposal company. The Intergraded Human Settlement must keep a record of the collection and ask the disposal company to provide them with proof of disposal at a suitably licensed facility. • Generator: Any spillages that may result will be managed as described above (How to clean up a spill – under vehicle maintenance). Diesel bowser: All staff member who dispense fuel must be trained to ensure they know - How to dispense fuel without spilling - How to clean up a spill as described above (How to clean up a spill – under vehicle maintenance). • The diesel bowser will be placed on a plastic-lined area, large enough to cope with minor spillages and leaks.
	Dust entrainment from vehicle / equipment, Windblown dust from exposed surfaces	Air quality	Operational	The effectiveness of all dust suppression measures will be visually inspected (ad hoc) to determine where maintenance is required. If plumes of dust are seen being emitted from the “suppression areas”, the cause must be investigated and remediated.

6. A DESCRIPTION OF PROPOSED IMPACT MANAGEMENT ACTIONS IDENTIFYING THE MANNER IN WHICH THE IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES WILL BE ACHIEVED

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
1. Site rehabilitation and earthworks	Dust	Air quality	Construction	When dust is visible dust across the Integrated Human Settlement boundary it must be suppressed by watering the area. All haul roads (only those being used at the time) will be watered with a water cart daily, with the exception of days when the roads are already wet as a result of rain. A speed limit of 30km/h will be enforced on all unpaved roads.	NEM:AQA,
	Presence of equipment being unsightly	Visual	Construction	Implement good housekeeping practices, e.g. All raw materials must be stored in the designated areas. All waste generated must be disposed of as described below under Waste Management.	None
	The rubble dumps will make the land unavailable for other uses	Land use	Construction	Implement concurrent rehabilitation so that the land can be used for other purposes.	None

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
	The presence of equipment and resources such as fuel at the site may attract would be thieves. Job seekers attracted to the area for job opportunities that may not be available and may resort to crime.	Crime and security	Construction	The entire construction area will be fenced with equipment and resources being contained within. 24 hour security will be available at the site.	None
	Filling in of existing borrow pits Removal of alien vegetation Promotion of establishment of indigenous species	Restoration of the construction area	Construction	Rehabilitate the footprint as far as is practicable, a state where by it can complement surrounding land use activities and does not represent a source of pollution . - remove alien vegetation - promote the growth of indigenous vegetation Deep trenches and pits will be refilled with low grade rock. The entire construction area will be inspected for any signs of pollution and if identified it will be removed and disposed of in a registered landfill site. Areas compacted as a result of construction activities will be loosened to promote self-vegetation, and any	NEM:BA,

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
				ruts created by accessing or leaving the site will be filled to ensure that no future erosion shall emanate from the site.	
	Those impacts associated with the behavior of vehicles off-site. Potential impact that traffic has on the roads in the vicinity of site.	Social / traffic	Construction	No overloaded vehicles will be allowed to leave the site. Complaints regarding bad driving will be taken up directly with the drivers to increase awareness of the potential negative implications of bad driving. Any vehicle arriving to collect product, that is noted to be releasing unacceptable pollution (i.e. clouds of exhaust fumes or leaking oil), will not be allowed on-site. – The driver will be informed of the reason the vehicle is being denied access and will not be allowed on-site until the necessary repairs have been undertaken.	None
	Destruction of a cultural / heritage artifact	Cultural / heritage	Construction	If any evidence of archaeological sites or unmarked human burials is found during construction activities, the South African Heritage Resources Agency (SAHRA) must be alerted immediately, and an accredited professional archaeologist must be called in to inspect the findings and compile a report on the findings and be submitted to SAHRA for further decision making on this matter. During this time all construction activities must be stopped.	NHRA

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
	Hydrocarbon spills and other contaminants infiltrating the groundwater	Ground Water	Construction	As and when spills occur, all contaminated material must be lifted and stored in containers that do not leak (the type of container will be determine by the volume of contaminated material to be stored). Dispose of contaminated material by one of the following methods. Transportation to a bioremediation site. OR Disposed as hazardous waste. Keep a record of the collection and disposal, ensuring the following documentation is obtained: The bioremediation facility provides proof of acceptance and treatment. The hazardous waste disposal company provides proof of disposal at a suitably licensed. Disposed as hazardous waste. Keep a record of the collection and disposal, ensuring the following documentation is obtained: The bioremediation facility provides proof of acceptance and treatment. The hazardous waste disposal company provides proof of disposal at a suitably license	NWA, NEM:WA
	Construction	The entire construction area will be fenced with equipment and resources being	Construction	The entire construction area will be fenced with equipment and resources being contained within. 24 hour security will be available at the site.	Construction

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
		contained within. 24 hour security will be available at the site.			
	Pollution from hydrocarbon spills, Erosion	Soil	Construction	If erosion is identified on the site, the following corrective action must be taken: Repair erosion (fill the gully), Identify the cause of erosion (e.g. source of fast water flow), Undertake appropriate remediation to avoid further erosion, i.e. divert the flow of storm water away from the affected area. As and when spills occur, all contaminated material must be lifted and stored in containers that do not leak (the type of container will be determine by the volume of contaminated material to be stored). Dispose of contaminated material by one of the following methods: - Transportation to a bioremediation site. OR - Disposed as hazardous waste.	NWA, NEM:WA

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
	Alteration of surface water flow by changing the current topography - Hydrocarbon pollution from construction equipment / maintenance activities	Surface water	Construction	Ensure the separation of clean and dirty water areas. - Divert “clean” storm water away from the construction area via trenches / berms / diversions channels (suitable to influence the natural flow of run-off). - All stormwater structures will be inspected, on a monthly basis, for damage and necessary repairs implemented within 5 days. As and when spills occur, all contaminated material must be lifted and stored in containers that do not leak (the type of container will be determine by the volume of contaminated material to be stored).	NWA, GN 704 NEM:WA
Operation of the Integrated Human Settlement	Impact to the local communities quality of life during this activity	Sense of place	Operational	Every effort must be made to implement the management measures in the EMP so as to manage the impacts. All complaints received by the operation must be recorded. The information recorded must include, but is not limited to: • Date of complaint. • Name and contact details of complainant. • Nature / Description of the complaint. • A description as to how the complaint will be addressed. • A proposed target date for rectifying the complaint.	None

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
				• Date when corrective action was implemented (if necessary). • Confirmation / Explanation of feedback provided to the complainant. A list of any monitoring or follow-up work that is required, including target dates.	
	Poor waste management and housekeeping being unsightly	Visual	Operational	Implement good housekeeping practices, e.g. All raw materials must be stored in the designated areas. All waste generated must be disposed of as described below under Waste Management.	NEM:WA
	Pollution from hydrocarbon spills and other contaminants	Soil	Operational	Waste Management: Labeled bins will be provided for domestic and hazardous waste streams. Employees and learners will be made aware of the importance of appropriate waste management practices. Waste removal will be undertaken by a reputable service provider prior to the bins reaching capacity. Disposal certificates must be requested from the service provider and be kept on record. In the case of spillages or leaks, spill will be contained by preventing its spread using sand or other material on site. The spillage and any other contaminated	NEM:WA

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
				material will be transferred into a suitable container. The container should be sealed and disposed appropriately. Vehicle Maintenance: Should maintenance work be required, a contractor will be commissioned to undertake the necessary work on-site. Drip trays must be used when carrying out maintenance activities. Any spillages that may result will be managed as described below: - How to clean up a spill: • Contain the spill by constructing earth walls from loose soils on-site. • Cover the contained spill with an environmentally acceptable absorbent or soils. It is preferable to use an absorbent as less material is required to absorb the spill and the bioremediation action starts taking place immediately. • The polluted soil and the material used to cover the spill will then be removed from the spill site and collected in drums (that do not	

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD \ LEGISLATION TO BE ACHIEVED
				leak). • The drums containing the contaminated material must be covered with a lid to prevent the contents of the drum from being spilled if knocked over and prevent the containers being. • Diesel bowser: All staff member who dispense fuel must be trained to ensure they know - How to dispense fuel without spilling - How to clean up a spill as described above (How to clean up a spill – under vehicle maintenance). • The diesel bowser will be placed on a plastic-lined area, large enough to cope with minor spillages and leaks.	
	Dust entrainment from vehicle / equipment, Windblown dust from exposed surfaces	Air quality	Operational	The effectiveness of all dust suppression measures will be visually inspected (ad hoc) to determine where maintenance is required. If plumes of dust are seen being emitted from the “suppression areas”, the cause must be investigated and remediated.	NEM:AQA, GN 827

7. ROLES AND RESPONSIBILITIES OF THE PROJECT TEAM

7.1 IMPLEMENTATION OF EMPr

Several professionals will form part of the project team. The most important from an environmental perspective are the Project Manager, the Environmental Control Officer (ECO), and the contractor to be appointed. The Project Manager is responsible for the implementation of the EMPr on the site during the Construction phase of the project. The ECO is responsible for monitoring the implementation of the EMPr during the construction phase of the project. The contractor is responsible for abiding by the mitigation measures of the EMPr which are implemented by the Project Manager during the construction phase. Department of Local Government and Human Settlement is responsible for Operational and Decommissioning phases of the project. Decommissioning will however entail the appointment of a new professional team and responsibilities will be similar to those during the design, pre-construction and construction phases. It is unlikely that the bridges will be decommissioned for several years.

7.2 PROJECT MANAGER

The Project Manager is responsible for overall management of project and EMPr implementation. The following tasks will fall within his / her responsibilities:

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

7.3 ENVIRONMENTAL CONTROL OFFICER

The Environmental Control Officer is responsible to monitor the implementation of the EMPr during the construction phase as well as liaison and with the contractor landowners and authorities. The contract documentation provided to the Contractor includes Employer's Requirements detailing the technical specifications for the construction and operation of the Integrated Human Settlement with which detailed design must comply and this EMPr, with which the Contractor is legally bound to comply. The Invitation for Bid (IFB) document will typically specify a number of requirements for environmental compliance that the Contractor will be required to implement. This includes the appointment of staff to

handle different aspects of environmental and social safeguards such as an Environmental Compliance Officer (ECO).

The following tasks will fall within his / her responsibilities:

- Be familiar with the recommendations and mitigation measures of this and to provide input into the EMPr.
- Conduct weekly / monthly audits monitoring of the construction site according to the EMPr.
- Educate the construction team about the management measures of the EMPr.
- Regular liaison with the construction team and the project leader.
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the EMPr.
- The affected parties shall always be kept informed about any changes to the construction programme should they be involved. If the ECO is not on site the contractor should keep the affected parties informed.
- Report non-compliance to the Engineer, as applicable and recommend corrective action.
- Attend site meetings to be able to report on and respond to any environmental issues and be issued copies of minutes of such meetings.
- Take photographs (digital) of the site prior to, during and immediately after construction and rehabilitation as a visual reference.
- Inform the Engineer immediately where clearly defined and agreed “no-go” areas are violated or in danger of being violated,
- Provide input into the Engineer’s environmental compliance documentation and monitor compliance.
- Prior to commencement of work on site, the Contractor shall be briefed by the Engineer and ECO on obligations related to environmental controls and methodologies in terms of the EMPr. The briefing will take the form of an on-site talk and demonstration and any other written or graphic material applicable to the project. The ECO is to be involved in monitoring the following aspects:
- Impact Avoidance and Minimization Documentation Effectiveness of the storm water management system
- Erosion, vegetation protection and restoration/rehabilitation
- Construction staging areas (environmental clearances)
- Cultural and historical issues and commitments
- HIV/AIDS education and awareness programme
- Environmental education and awareness training
- Other commitments made in the environmental authorisation

- Specific on-site administration the ECO will be required to do include:
- Conduct quarterly or six monthly environmental audits during the construction phase to check adherence to the management provisions of the EMPr.
- Compile a quarterly or six monthly environmental audit report based on the findings of the regular audits and submit to Engineer.
- Monitor the Contractor's record of environmental incidents (Incident Book) such as spills, impacts, transgressions, including nature and extent of the incident, cause, responsibility, and corrective and preventive actions taken. All incidents must be reported to the Engineer and a summary of recorded incidents must be included in the monthly audit reports.
- Monitor Contractor's complaints register in which all social and environmental complaints and any actions taken are recorded.
- The contact numbers of the contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.
- The Contractor is responsible for the implementation and compliance with recommendations and conditions of the EMPr. Ensure compliance with the EMPr at all times during construction activities. Maintain an environmental register which keeps a record of all incidents which occur on the site during construction of bridges. These incidents include but not limited to:
    - → Public involvement / complaints
    - → Health and safety incidents
    - → Incidents involving Hazardous materials stored on site
    - → Non-compliance incident
    - → All incidents are to be reported to the Environmental Liaison Committee (ELC) as per reporting procedure.

7.4 THE CONTRACTOR

With specific reference to the EMPr, the role of the Contractor will be to:

- Implement, manage and maintain the construction elements of the EMP for the duration of his/her contract;
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the construction EMPr;
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties;
- Ensure that all sub-contractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site or during the provision of their services off site;

- Ensure that all sub-contractors and other workers appointed by the Contractor are complying with, and implementing the construction EMP during the duration of their specific contracts; and
- Provide appropriate resources – budgets, equipment, personnel and training for the effective control and management of the environmental risks associated with the construction of the project.
- Be familiar with the contents of the EMP and the specifications contained herein;
- Comply with the Environmental Specifications contained in the EMP and subsequent revisions;
- Confirm legislative requirements for the construction works, and to ensure that appropriate permissions and permits have been obtained before commencing activities;
- Undertake daily site inspections to monitor environmental performance and conformance with the Environmental Specifications;
- Notify the ECO and RE immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken;
- Notify the ECO and at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigatory measures may be implemented timeously;
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them.

8. MONITORING

8.1 ENVIRONMENTAL MONITORING

Monitoring efforts would be in vain in the absence of an organized record keeping practice. It is the responsibility of the client management to ensure the development of a database that includes a systematic tabulation of process indicators, performed computations, maintenance schedules and logbook, process control and performance monitoring outcomes. Such a historical database benefits both the plant operator and design engineers. Also, in accordance with the requirements of the regulatory authority, ECO should submit a periodic water quality monitoring programme to DWS. This programme will include:

- Daily monitoring and monthly audits will be conducted by the Environmental Control Officer to ensure compliance to the EMPr conditions, and where necessary make recommendations for corrective action.
- Compilation of an audit report with a rating of compliance with the EMPr. The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time

of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. The contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the Landowner or community. All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

8.2 INSPECTIONS

During both the construction and the operational phases of the project, regular inspections of the construction site or of the operational facility are to be undertaken, preferably by a third party. The inspection reports are to be kept on file and to be made available to representatives from the DWS and NW-READ or to an External Auditor upon request.

9. TRAINING AND CAPACITY BUILDING

Training is essential for ensuring that the EMPr provisions are implemented efficiently and effectively. Training needs are to be identified based on the available and existing capacity of site and project personnel (including the Project Proponent, Contractors and Sub-contractors) to undertake the required EMPr management actions and monitoring activities. It is important that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

In addition to training, general environmental awareness is to be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimized and environmental compliance maximized. The onus is on the different parties involved in the various stages of the life-cycle of the project to be environmentally conscious. Contractors are to forward internal environmental awareness and training procedures to the Project Manager and Environmental Control officer for comment prior to the commencement of the project.

10. CREATING ENVIRONMENTAL AWARENESS

10.1 ENVIRONMENTAL AWARENESS TRAINING

10.1.1 OBJECTIVES

Before starting training or regular work, all employees will be required to attend an induction programme, which shall include site safety procedures (e.g. blasting), emergency procedures, health and safety (e.g. HIV/AIDS), and environmental safeguards. The Contractor must ensure that all people involved in the project (including sub-contractors, casual workers, drivers etc.) are aware of and familiar

with the environmental requirements for the project. Environmental Induction should ensure that the workforce:

- Understands the key environmental features of the Site and environs and the kind of activities that impact on them;
- Are thoroughly familiar with the environmental management measures contained in this EMPr and the environmental protection requirements as they apply to construction phase of the Integrated Human Settlement.
- Are trained in the identification of archaeological artefacts and flora and fauna of special interest that may occur on site and the measures that must be applied when they are encountered, and
- Are fully aware of all rules regarding general behaviour on site e.g. littering, noise, toilet behaviour, etc.

10.1.2 TOOLBOX TALKS

Site management will implement a program of toolbox talks for all personnel for the duration of the Project. Toolbox talks will be scheduled on a regular basis, but no less than once per fortnight for each work section or group, will be of adequate duration to cover relevant information and structured to encourage full participation by all personnel. Senior management may also call additional toolbox meetings at any time to discuss or highlight any aspect relating to safety, environment and quality. The Superintendent, Safety Manager and Environmental Manager will be responsible for preparing and conducting toolbox talks which will be focused on issues relating primarily to safety, quality and the environment. Topics to be covered in toolbox talks will be focused on issues relevant to upcoming works, works in or near sensitive receivers or environmentally sensitive areas or incidents that have occurred. Environmental topics will be determined by the EM and Superintendent and will include, but not be limited to:

- Minimising vegetation clearance;
- Exclusion areas including heritage and protected vegetation;
- Noisy works or works outside of normal working hours;
- Water management and water quality controls;
- Environment incidents;
- Changes to previously communicated environmental mitigation measures;
- Environmental procedures; and
- Environment alerts.

Toolbox talk topics, dates delivered and a register of attendees will be recorded and managed in accordance with the processes described in the Safety Plan.

10.1.3 MANAGEMENT AND MITIGATION

It is the Contractor's responsibility to ensure that all people involved with the project receive environmental awareness training before starting work on site. This shall include all new staff recruited during the construction phase. A signed register should be kept of each employee attending the course. Environmental training shall include but not be limited to the following:

- Awareness-raising of how different construction activities can impact on the environment, why it is important to avoid environmental damage and what steps can be taken to mitigate the impacts of construction activities.
- Identification of possible archaeological or historical objects and the requirement to notify the ECO or Engineer if such an object is found, and to be informed of 'No Go" areas of cultural heritage.
- General conduct on site such as noise levels (e.g. shouting and hooting), alcohol consumption, drug use, toilet behaviour, littering, no firearms, no pets, no harvesting of firewood / plants, no trespassing or damage to property, no throwing of cigarette butts into the veld etc.
- Responsible handling of chemicals and spills and correct disposal of chemical containers and other waste objects.
- Emergency procedures and incident reporting.
- Location of fire-fighting equipment and its use.
- HIV/AIDS awareness, including use of and access to condoms; and behaviour towards the local community.

The Contractor must maintain a record of all staff that have received Environmental Awareness Training and shall monitor the performance of the construction staff to ensure that the points that were relayed during their induction have been understood and are being followed. If required, a translator may be requested to explain aspects of the environmental requirements or acceptable social behaviour that are unclear. Consideration should be given to the feasibility of introducing fines for workers who transgress the rules e.g. littering, use of the veld as a toilet, damage to property, etc

10.1.4 DAILY PRE-START MEETINGS

The pre-start meeting is a tool for informing the workforce of the day's activities, safe work practices, environmental protection practices, work area restrictions, activities that may affect the works, coordination issues with other trades, hazards and other information that may be relevant to the day's

work. The Foreman will conduct a daily pre-start meeting with the site workforce before the commencement of work each day (or shift) or where changes occur during a shift.

Daily pre-start meetings are generally succinct in nature and take approximately 10-15 minutes. The environmental component of pre-starts will be determined by relevant foreman and environmental personnel and will include any environmental issues that could potentially be impacted by, or impact on, the day's activities. All attendees will be required to sign on to the pre-start sheet and acknowledge their understanding of the issues explained. Pre-start topics, dates delivered and a register of attendees will be recorded and managed in accordance with the processes described in the Safety Plan.

10.2 HEALTH AND SAFETY INDUCTION TRAINING

No Contractor is to permit an employee or person to enter the site, unless such employee or person has undergone health and safety induction training pertaining to the hazards prevalent on the site and is to be provided with the necessary personal protective equipment (PPE). This safety induction training includes informing all construction workers of the relevant Emergency Procedures. During safety induction, the employees are to be informed about all environmental, health and safety issues.

They are then to be issued with an Induction Certificate that is kept on file. An example of the aspects to be included in such training are listed in the box below.

Chapter 1: HSE Policy

Chapter 2: Safety (HSE Representative, Duty to inform, PPE, Safety signs, Security, Discipline procedure, Competency/Qualifications, Health and hygiene, Environment, Waste management, etc.)

Chapter 3: Operational Safety (Operation of equipment; hand tools; manual lifting of heavy objects; moving equipment; fires; cleanliness; wires, ropes, chains and hoisting plugs)

Chapter 4: General Safety (General safety rules; working near electricity lines; travelling on a back of a truck; working on scaffolding; working in trenches or excavations; and using a ladder or climbing the mast)

Chapter 5: General Rules on Site (before starting machinery; while on site; emergency procedures; site layout; and medicals)

10.3 EMERGENCY PLANNING AND RESPONSE PROCEDURES

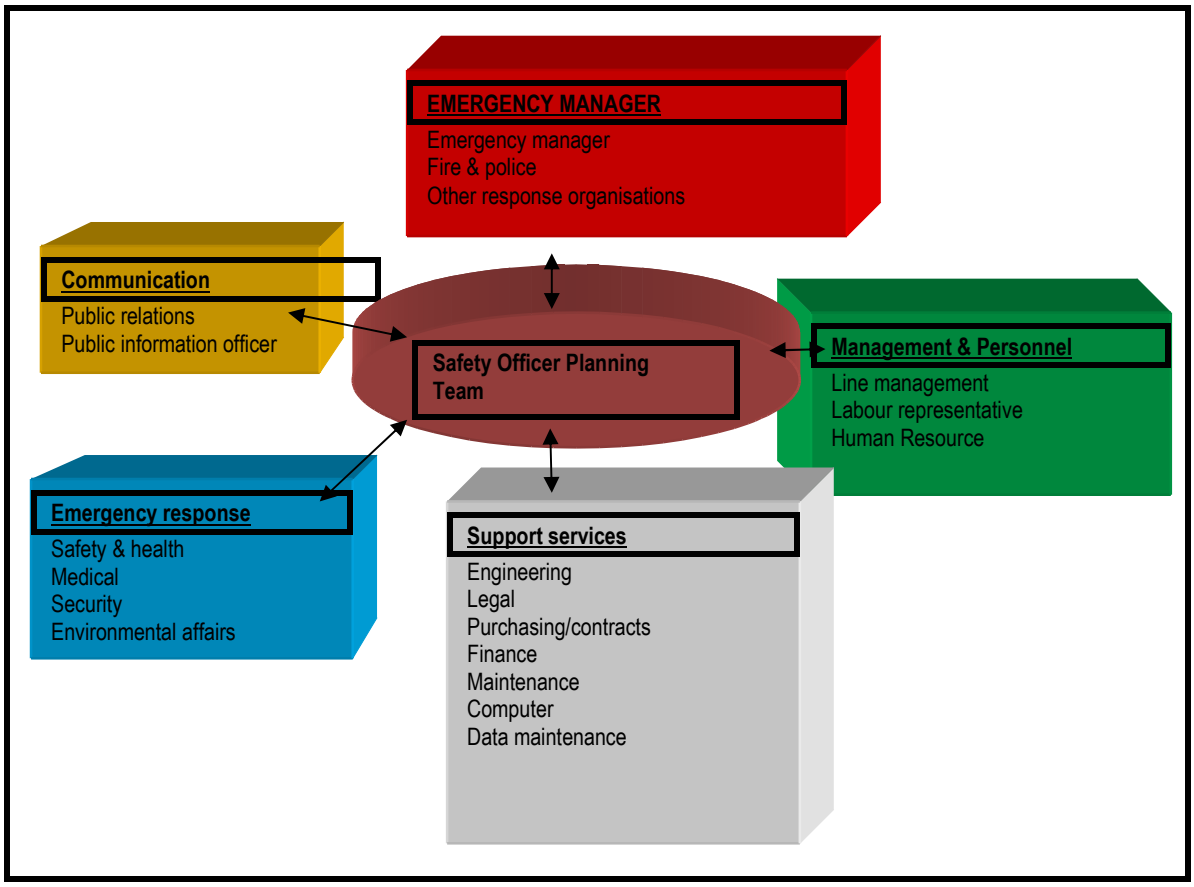
The Contractor is to explain and implement emergency procedures and plans for events such as fire, explosion, spillage of hazardous substances, evacuation, etc. to staff prior to any construction activities

taking place (usually during induction phase). The following associated activities are to be undertaken by the Contractor:

- Development and compilation of an emergency procedure and plan.
- Emergency Procedure and Plan is to describe the measures required to manage emergencies during the construction phase and transportation and / or storage of hazardous materials and waste;
- The Contractor is to ensure that emergency procedures mock training sessions are carried out.
- The Contractor is to inform his workforce of the locality of the designated emergency meeting point.
- Emergency contact numbers are to be displayed in prominent places and are to include numbers such as the Police, the Fire Department, Ambulance Services, etc.

In order for a specific EPP to be developed for the proposed construction of the Intregrated Human Settlement and operation the contractor and operator will be required to refine the EPP using the team members as indicated in Figure 3. The team members will be staff of the Operator for the proposed development of an Integrated Human Settlement.

Figure 3: Typical team for development and Maintenance of Emergency Preparedness Plan



The client for the proposed development of an Integrated Human Settlement construction and widening of the bridge should have a dedicated person, e.g. Emergency Officer to prepare the response of the organization for an emergency situation and to oversee the technical aspects of the response, as well as interfacing with the community, the media, outside response organizations and regulatory agencies, as required. The Emergency Officer must be an employee and a member of management with the authority to make decisions.

He/she will be responsible for frontline management of the incident, for tactical planning and execution, for determining whether outside assistance is needed and for relaying requests for internal resources or outside assistance through an Emergency Operations Centre (EOC).

10.4 HEALTH AND SAFETY PLAN

The Contractor is to provide and demonstrate to the Project Engineer a suitable and sufficiently documented Health and Safety Plan that shall be applied from the date of commencement of and for the duration of the construction work. The Contractor is to ensure that the construction site / lay down area complies with Occupational Health and Safety (OHS) Regulations during the construction phase. Applicable sections of the regulations are listed in Table 8. (This list is not comprehensive and may be added to).

Table 6: Occupational Health and Safety Regulations for Construction

Construction OHS Regulations	Examples of aspects to Audit
Chapter 1	HSE Policy
Chapter 2	Safety (HSE Representative, Duty to inform, PPE, Safety signs, Security, Discipline procedure, Competency/Qualifications, Health and hygiene, Environment, Waste management, etc.)
Chapter 3	Operational Safety (Operation of equipment; hand tools; manual lifting of heavy objects; moving equipment; fires; cleanliness; wires, ropes, chains and hoisting plugs)
Chapter 4	General Safety (General safety rules; working near electricity lines; travelling on a back of a truck; working on scaffolding; working in trenches or excavations; and using a ladder or climbing the mast)
Chapter 5	General Rules on Site (before starting machinery; while on site; emergency procedures; site layout; and medicals)

11. DOCUMENTATION AND RECORD KEEPING

A document handling system is to be established to ensure accurate updating of EMPr documents, and availability of all documents required for the effective functioning of the EMPr. The document handling system is to be devised by the Project Proponent and/or Contractor, and agreed upon by all key parties. Responsibilities must be assigned to relevant personnel for ensuring that the EMPr documentation system is maintained and that document control is ensured through access by and distribution to, identified personnel. Supplementary EMPr documentation could include:

- EMPr implementation activity specifications (including Method Statements);
- Site instructions;
- Emergency preparedness and response procedures;
- Incident reports;
- Training records;
- Site inspection reports;
- Monitoring reports;
- Auditing reports; and
- Complaints received.

The ECO is typically responsible for ensuring that the registration and updating of all relevant EMPr documentation is carried out. It is usually the responsibility of the Project Manager to ensure that all personnel are performing according to the requirements of this procedure and to initiate the revision of controlled documents, when required by changes in process, operating procedures, legislation, specifications, audit findings or any other circumstances, by informing the Environmental Control Officer of the changes.

Copies of all EMPr documentation should be kept on site or at the nearest project office. The documents should be kept as hardcopies as well as in electronic format. Documents must be revised as required by changing circumstances. The Contractor is to comply with the actions listed below in terms of incidents, accidents and near misses:

- All accidents, incidents and near misses must be reported by the end of the shift on which the accident, incident and/or near miss occurred.
- The Contractor will take whatever corrective action is necessary to address incidents, accidents and / or near misses. The corrective action is to be discussed the following day during the 'toolbox talk' session together with lessons learnt from the event.

- A comprehensive weekly incident report must be forwarded to the Project Engineer on a weekly basis.

The Contractor is to ensure that the incident report is kept on file and available for review during audits.

12. REPORTING PROCEDURES

Reporting procedures for conveying information from the monitoring activities must be developed for the project in order to ensure that management is able to take rapid corrective action should certain thresholds be exceeded. The EMPr is to contain reporting procedures for dealing with:

- Inspections;
- Accidents and emergencies;
- Measuring performance indicators and interpreting and acting on the indicators;
- Records of monitoring activities to test the effectiveness of mitigation measures and impact controls, as well as for compliance auditing purposes; and
- Training programmes and evidence of appropriate levels/amount of skills/capacities created.

The Invitation for Bid document is likely to specify that reporting procedures should be detailed by the Contractor. These will likely include information on who will be responsible for compiling what reports; who must receive copies; information to be contained in these reports; pro form a or template structure for each report; timing and frequency of response; approvals required, and where copies should be kept. However, reports that are required to ensure adequate record-keeping are specified below.

The issues identified in this EMPr need to be documented in a format that is readily available for review/auditing. The ECO should meet with the Contractor/Engineer on a regular basis, e.g. weekly to discuss the contractors' tasks and review the progress from the past week. The ECO and the Contractor should discuss and agree on the issues in the EMPr and how they should be managed and mitigated as well as agree on the QA/QC targets as specified in the EPP The agreed upon mitigation measures should be documented and the agreed upon QA/QC targets signed off.

12.1 DOCUMENT HANDLING AND RECORD KEEPING

All meetings and site inspections should be recorded and filed (in hard copy and electronically) for future reference and to provide input into monthly reports. **Minutes of meetings:** Regular meetings should be held between the ECO, CRO, Engineer and Contractor to discuss the schedule of construction activities and requirements for adherence to the EMPr requirements on a weekly basis, at least, or more frequently if required. The minutes of such meetings should be recorded immediately,

and shall include the activities to be done, the responsibilities for carrying them out, and deliverable dates. The minutes should be circulated to those concerned and hard and electronic copies filed for safe-keeping. These minutes should provide the basis for follow up at subsequent meetings.

12.2 MONTHLY REPORTS

Monthly review meetings should be held with the Developer, ECO, CRO, and the Contractor to confirm the status of the construction progress and issues associated with implementation of the EMPr. The meetings should aim to collate the inputs for preparation of a monthly report. The monthly report should synthesize all information on work progress, scheduling changes, recorded incidents and complaints, monitoring results, site problems and risks/hazards, areas of compliance and non-compliance with the EMPr targets, and measures take or required to rectify problems.

Monthly reports should be circulated by email and in hard-copy to all on-site managers (ECO, Engineer, CRO and contractor supervisor) as well as Developer and the QAO. The targets and reports relating to the EMPr that DEA has approved in the environmental authorisation should be documented in the form of minutes with agreed upon targets, outputs, QA/QC and deliverable dates. The documents/minutes should be signed off by the ECO and the Contractor once a week to indicate progress and confirmation with prescribed QA/QC with regards to the EMPr.

12.3 INCIDENTS AND ACCIDENTS REGISTER

The ECO should compile and keep an Incidents and Accidents Register on site in which all incidents and accidents are recorded, e.g. chemical spills, fires, accidents involving workers and vehicles, etc. The following information must be recorded in the Incidents Register:

- the name and contact details of the persons involved
- the person recording the incident
- the date and time of incident
- the nature, extent and cause of the accident
- the name and contact details of any persons notified of the incident
- the actions taken to deal with the incident and whether the accident has been sufficiently dealt with
- additional steps required to prevent recurrence of the incident

13. STAKEHOLDER ENGAGEMENTS

13.1 COMMUNITY RELATIONS OFFICER

The Contractor shall appoint a suitably qualified and experienced community relations officer (CRO) acceptable to the Engineer with all necessary support staff and facilities. The CRO shall be responsible for liaising and co-operating with community leaders and organisations for the purpose of:

- Keeping the local communities advised about the general progress of the Koikoi (kruchers) bridge.
- Giving advance notification to the local community when particular operations will commence and finish, particularly those which might inconvenience the inhabitants of the area or against which they should take safety precautions.
- Receiving and replying to complaints from the general public about all matters related to the Works.
- Ensuring that remedial and corrective action is taken wherever necessary in response to complaints from the public.
- Supporting community awareness programmes and local development programmes.
- Publicising training and job opportunities.

Such measures are to be undertaken with a view to inculcating in the inhabitants of the areas an acceptance that, despite any temporary or permanent inconvenience that may be caused to them, they will reap direct short and long term benefits from the construction and subsequent operation and maintenance of the lodge, in addition to the indirect benefits to be derived from the increased national wealth resulting there from.

13.2 STAKEHOLDER ENGAGEMENT

The main benefit of involving stakeholders in the EMPr is to include local knowledge, e.g. in the design of monitoring activities, and to ensure that the EMPr addresses aspects of the project that could be a source of social risk. Stakeholders need to understand that their safety, health and environment are not being compromised. They should be kept informed so that no uncertainty exists in this regard.

13.3 GRIEVANCE PROCEDURES

A formal grievance procedure must be developed by the Contractor. The Contractor is to notify IAPs where a complaints register is kept and how they can bring any grievances or issues of concerns to the Contractor's attention. The Contractor is to develop a procedure to address complaints. The protocol is to include the following aspects:

- Name and Contact details of Complainant and date of complaint
- Nature of Complaints, i.e. health related, environment related, safety related or community related.

- Details of complaint, i.e. exact location of incident, severity (emergency situation or not) associated impact, stakeholders involved, frequency of incident, etc.
- Manner in which complaint has been resolved.

14. AUDITING

Typically, an audit analyses the results obtained from monitoring assesses whether objectives and targets have been met and whether there are variances from the stipulated EMPr and legal requirements. In addition, the audit assesses whether EMPr implementation has been undertaken according to planned arrangements and that the EMPr itself is being appropriately updated. The audit should confirm that identified corrective actions have been undertaken and then assess the effectiveness of such actions. The timing of audits should be included in the implementation schedule in the EMPr. The key steps in a successful audit are:

- Establish audit procedures.
- Determine the frequency of audits.
- Ensure that the auditors are competent, in that they must be able to undertake the audit objectively and competently. Audits may be undertaken by internal or external parties, although certain I&AP requirements may define a need for external auditors.
- Maintain records of audits. A procedure is to be developed by the project management team for conducting EMPr audits, and should incorporate processes for scheduling and reporting, as well as the timing and frequency of the audits. This procedure should also address responsibilities and required resources. The ECO is usually responsible for the maintenance of the environmental audit information that is required prior, during and after an audit.

15. SAFETY AND SECURITY

Safety is provided to community from the construction site

- The PM is responsible for the safety of all staff, visitors and bystanders on the construction site thought all the phases of the project where he emails the project manager.
- The contactor to ensure the safety of persons on site, at the site camp after working hours, on weekend's and public holidays.
- Any crimes to be reported to the Police (SAPS). These incidents must be reported by the PM of trough the knowledge of the project manager.
- All employees must be clearly identifiable
- Proper supervision of the employees at all the times.
- Construction activities must remain within the construction footprint.
- No unauthorised people must be allowed in the site.

16. CHECKLIST FOR MINIMUM ENVIRONMENTAL PROVISION

The checklist is aimed at a high level guideline for the budget provision to be able to implement the EMP. It must be read in conjunction with the other documents and does not exempt any other clause that has been stipulates for compliance with the EMP document. In the event of apparent contradictions within the EMP document, will apply the check list. The contractor will not be reimbursed for the items on the list if they are to form part of budgeting for environmental compliance.

The following items are to be available on the construction site, for immediate implementation.

General

Signage

1. No go areas
2. A sign at the entrance of the construction site offices indicating the following information

a) The contractor's contact numbers.

b) Other relevant emergency numbers.

Pollution Prevention

1. Fire protection equipment
2. Waste bins and receptacles that comply with the waste clauses of the EMP.
3. Adequate serviced ablution services
4. designated eating and smoking areas
5. Water carts to adequately water the site minimum of twice a day
6. Spillage kits for all construction vehicles and be easily available on site
7. Screening of unsightly works
8. Drip trays for all vehicles parked overnight
9. Barricading the demarcation of the edge of the working area
10. Hard impervious surfaces for the storage for storage of chemicals.
11. bunding facility for hazardous products.
12. labeled containers for decanting of liquids.