PROPOSED ERMELO EXTENSION 40 (ERF 16244) SHOPPING CENTRE DEVELOPMENT

DRAFT ENVIRONMENTAL MANAGEMENT PLAN REPORT

MDALA Ref No: 17/2/1/16 MP 120

DATE: August 2015

BAOBERRY

ENVIRONMENTAL MANAGEMENT PLAN REPORT:

DRAFT ENVIRONMENTAL MANAGEMENT PLAN REPORT FOR THE PROPOSED ERMELO EXTENSION 40 (Erf 16244) SHOPPING CENTRE DEVELOPMENT

Contents

1. SUMMARY

1.1 Project description

GTF Trust received authorisation in 2010 for the establishment of a residential township on portion 13 and 188 (Extension 39 and 40) on the farm Nooitgedacht 268-IT.

GTF Trust is planning to develop a shopping (commercial) centre on stands located on extension 40 (see figure 1) which is to be consolidated and known as ERF 16244 (measuring 17 825 m2 as site footprint of total site area 101 238m2) which requires an amendment to the Environmental Authorisation and the Environmental Management Programme.

2. OBJECTIVES OF THE ENVIRONMENTAL MANANAGMENT PLAN (EMP)

This document provides the appropriate mitigation measures designed to minimise or to eliminate significant adverse impacts that may result from the construction, operational, decommissioning and closure activities.

The primary objectives of the EMP are to:

- Describe actions for achieving the mitigation measures prescribed, inter alia, by the EIA
- Define organisational and administrative arrangements for environmental management and monitoring of the work contract, including defining co-ordination, liaison and reporting procedures and responsibilities of staff.
- Ensure that site supervision staff understand the recommended pro-active environmental management measures, so that potential problems can be identified and mitigation measures adopted prior to rehabilitation work being carried out, and to
- Define actions for environmental control, in the event of pollution or similar events requiring action.

3. ENVIRONMENTAL ASPECTS ANDF IMPACTS

3.1. Environmental aspects

Environmental aspects are defined as ‘those components of the company’s / development activities, products and services that are likely to interact with or change the environment’. Examples of environmental aspects are:

- waste generation and disposal
- storm water and contaminated water discharge (wastewater management)

- chemical use operational
- use of natural resources
- product disposal, etc

3.2. Environmental impacts

Environmental impacts are defined as ‘any change to the environment, whether adverse or beneficial, resulting from an environmental aspect. Listed below, for example, are some environmental impacts that could adversely affect the environment:

- pollution of surface water resources by contaminated runoff;
- emission of harmful gases and/or particulates into the atmosphere;
- deteriorating the ecosystem;
- erosion.

Primarily the aim of the EMP is to recognise the environmental aspects associated with each activity, as well as its environmental effects, and plan the activity in such a way that adverse impacts are minimised or prevented, but benefits are enhanced. An EMP is a dynamic plan that must be adapted as and when necessary. In the event that the planned results are not achieved because of misapplication or inadequacy of the measures applied, the situation should be analysed and assessed critically, by specialists if deemed necessary, with the objective of developing effective measures.

4. LEGAL REQUIREMENTS

This EMP, once approved by the local Competent Authority (CA), becomes a legally enforceable commitment that must be honoured by GTF Trust.

With reference to any construction or service work performed by a contractor to GTF Trust, the EMP must form an integral part of the contract documents, informing the contractor about his duties and obligations in the fulfilment of the project objectives, with particular reference to the prevention of adverse environmental impacts associated with the contractor’s activities. The contractor shall note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of amendments to the Particular Conditions of Contract that pertain to the services provided by the contractor. If any rights and obligations contained in this document contradict those specified in the standard or project specifications, then it is the responsibility of the contractor to bring such contradictions to the attention of GTF Trust. The responsible GTF Trust Manager(s) must resolve such contradictions appropriately without detracting from the objectives of the EMP.

The responsible project manager of GTF Trust and all Contractors providing services pertaining to the envisaged development must be conversant with all relevant environmental and safety legislation. In addition, they must also take cognisance of Provincial and Local Government Ordinances that may be applicable to this development.

5. DOCUMENT LAYOUT

This EMP is divided into the following sections:

1. Management guidelines: forms the basis for environmental management on site
2. General mitigation measures: pre-construction, construction, closure and rehabilitation activities- which involves those environmental issues, procedures and controls that relate to projects of this nature in general
3. Specific mitigation measures: construction, operational, closure and rehabilitation activities- which are those specific environmental issues, procedures and controls, that is relevant to the envisaged development coming from the specialist studies.
4. An updated section on mitigation measures applicable to Ermelo Extension 40 (Erf 16244) included following the environmental authorisation amendment process concluded in August 2015.

6. MANAGEMENT GUIDELINES

These guidelines form the basis for environmental management on site. An EMP should be viewed as a dynamic document that must be updated from time to time, e.g. after obtaining comment from regulating authorities and other stakeholders, during construction and throughout the operational life of the activities.

It must also be a living document in the sense that environmental management must be integrated, along with health and safety and general management of the activities.

Should these guidelines require modification or additions during the project, this shall be done at the discretion of the Environmental Control Officer (ECO). The ECO shall ensure that any modifications are communicated, explained to and discussed with all affected parties (i.e. the authorities, the Contractors and the operational personnel).

6.1. Resource allocation

In order to ensure that this EMP is implemented, the following staff resources shall be made available:

1. An Environmental Control Officer (ECO) is appointed by GTF Trust (GTF) to assume responsibility for ensuring the environmental management measures contained in this document are implemented during construction and operational of activities.
2. A Project Manager, appointed by GTF Trust to manage construction of activities as per envisaged development. The project manager also has over-all responsibility for managing the project, Contractors and consultants and for ensuring that the environmental management requirements are met. The Consulting Engineer may also act as the Project manager. The project manager has the authority to stop any construction activity in contravention of the EMP in accordance with an agreed warning procedure.
3. Resident Engineer is the consulting engineer's representative on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the ECO. The Resident Engineer oversees site works, liaison with the contractors and the ECO.
4. Other roles as deemed necessary

6.1.1. Specific duties of the ECO with respect to environmental management

The ECO must:

- Know the background to the project and monitor the implementation of the EMP
- Act as a guide, advisor and consultant to the project manager and contractors on environmental issues during construction, implementation and rehabilitation
- Arrange for a post-construction audit, followed by regular auditing of environmental performance to ensure continued compliance with the EMP
- Identify non-compliances and problem areas, and provide action plans to avoid costly stoppages and / or further environmental damage
- Ensure that open communication lines exist for reporting of any significant environmental incidents to the MDALA and to resolve any problems or complaints from the public rapidly
- Propose changes (for approval) to the EMP as necessary. Update the EMP on a regular basis in consultation with the neighbouring property owners and all affected stakeholders
- Ensure that all environmental permitting requirements are met

6.1.2. Training

The Project Manager, together with the ECO shall ensure that adequate environmental training of all Contractors and labourers, as well as GTF Trust operating personnel, takes place. All employees / Contractors shall have an induction presentation on environmental awareness. The cost, venue and logistics shall be GTF Trust responsibility. Where possible, the presentation needs to be conducted in the language of the employees / contractors. The environmental training shall, as a minimum, include the following:

- Sensitive and no go areas on site
- The importance of conformance to the EMP
- The significant environmental impacts, actual or potential, of their work activities
- The environmental benefits of improved personnel performance
- Their roles and responsibilities in achieving conformance with the EMP, including emergency preparedness and response requirements
- The potential consequences of departure from specified operating procedures
- The mitigation measures required to be implemented when carrying out their work activities

6.1.3 Responsible parties

- Responsibility for the implementation of the EMP lies with GTF trust. This responsibility shall be delegated to contractors for practical purposes, but GTF Trust shall retain legal responsibility
- On-site assistance, monitoring of construction (to ensure compliance with this EMP) and environmental reporting shall be the responsibility of GTF Trust by way of an appointed ECO, employed by GTF Trust. Should there be inadequate on-site experience; the assistance of external consultants shall be sourced.

6.1.4. Monitoring and compliance by the Contractors

The ECO shall review the environmental management performance of the Contractors on a regular basis. The Contractors shall be deemed not to have complied with the environmental mitigation measures if:

- The measures of the EMP have not been met;
- There is evidence of negligence or recklessness resulting in the contravention of any of the clauses, both within and outside the boundaries of the construction site;
- The contractor fails to comply with corrective action or other instructions from the ECO or project manager
- The contractor fails to respond to complaints from the public. These complaints will be communicated to the contractor via the ECO or project manager;
- The contractor’s staff found poaching, harvesting plants or entering neighbouring areas.

ENVIRONMENTAL MANAGEMENT PLAN: ERMELO EXTENSION 39 AND 40 RESIDENTIAL DEVELOPMENT

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
1	**Initial planning**	Water pollution, air pollution, etc.	• Prepare and submit a detailed master plan 3 months prior to Site Establishment, to GTF for approval	Planners/ designers	Pre-construction, (planning and development)	
			• Landscape design of the construction site to be undertaken in conjunction with GTF	Proponent	Pre-construction(planning and development)	
			• Demarcate all work areas on site	Planners / designers	Pre-construction(planning and development)	
			• Submit a construction programme to GTF and include all environmental work / issues to be done on the site	Contractor	Pre-construction (planning and development)	
			• Develop a monitoring and auditing protocol for the Construction and operational phase operational	ECO / Proponent	Pre-construction (planning and development)	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• The responsible parties shall ensure that all equity regulations are adhered to	Contractor / Proponent	Pre-construction (planning and development)	
			• All compensation policies to be addressed before construction starts	Contractor / Proponent	Pre-construction (planning and development)	
			• Monitor the construction site at least every month during the construction phases and maintenance periods and for 1 year after the completion of the 12 months maintenance period (if applicable), for record purposes. Monitoring reports shall be recorded via the construction site meetings to the Contractor or ECO	Resident Engineer / ECO	Construction	
			• Auditing environment	ECO	Construction	
			• EMP enforcement / implementation	ECO / Resident Engineer	Construction	
			• Compliance to legislation	ECO / Resident Engineer	Construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Make provision on the Site construction meeting's agenda for: - Environmental planning - Rehabilitation - Site management - Access - Conservation - Social - Compensation - Monthly monitoring - Interaction with communities - Reports and records	ECO / Resident Engineer	Pre-construction (planning and development)	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
		Other	• Position and orientate developments and structures to maximise northern exposure and minimise frost belt situations in areas prone to extremely low temperatures and frequent frost • Consider the occurrence and frequency of extreme weather conditions such as flash floods, when siting and designing developments and structures • No development below the 1:100 year flood line to take place • Do not align pipelines under power lines • Pipelines that need to cross the urban stream must be incorporated into a culvert design where possible. Alternatively, the disturbed point of the crossing must be reinstated as close as possible to the original contours. Make allowance for erosion control structures to protect the backfilled trench. • Allow for ground truthing and final planning on site. The Environmental Planner, Design Engineer, Surveyor and contractor (where relevant) should be involved in this final planning • Plan for safe pedestrian and cycling access and crossings where necessary • Surfacing of access roads must respond to the anticipated use intensity of the development. Tarred surfaces should be considered for higher traffic routes. • Make use of existing roads and tracks where feasible, rather than creating new roads. • Design slopes aimed at the prevention of soil erosion, of efficient storm water control, of the eventual re establishment of vegetation and of ultimately achieving aesthetically landscapes • Stone pitch the outfalls of all grassed waterways and subsurface drains • Ensure that social and environmental ethics are addressed during the planning and design phase regarding size of houses and stands as well as finishes • Allow for the accommodation of disabled access and use where necessary. • Provide adequate numbers of dustbins in all public spaces. Ensure that dustbins are accessible and visible and serviced. • Incorporate lighting wherever night use is anticipated or required. • Provide signage required in terms of legislation, municipal bylaws and SABS safety standards. • An environmental code of conduct should be developed which will need to be implemented over all phases of the envisaged development.	Proponent	Pre-construction (planning and development)	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
2	**Site Establishment :**	Water pollution, air pollution, etc. The contractor to establish himself with due cognition of the environmental risks associated with the activity	• The Contractor shall submit as part of the technical Report submitted with his Tender, and environmental management plan approach by which any possible environmental degradation / impact is controlled and prevented. The contractor must also provide a method statement on protocols to be followed, and contingencies to be put in place for the following potential incidents before construction may begin: Contamination of water sources from spills; contamination of soils from spills; and fire.	Contractor / Resident Engineer /ECO	Pre-construction (planning and development)	
			• Provide the ECO / Resident Engineer with a complete construction works programme for their approval, prior to construction	Contractor / Resident Engineer /ECO	Pre-construction (planning and development)	
			• Identify, map, mark in an approved manner and monitor all specified trees, transplantable specimen trees and all other relevant plant materials to protect against construction work / activities adjacent to and within the work areas	Contractor / Resident Engineer /ECO	Pre-construction (planning and development)	
			• Ensure that all social related issues / policies and structures is in place before construction commences	Contractor / proponent	Pre-construction (planning and development)	
			• The contractor shall ensure that all works are undertaken in such a manner that vegetation outside the Works area is not damaged under any circumstances	Contractor	Pre-construction (planning and development)	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Trees that have been selected for conservation by the ECO / Resident Engineer shall be fenced around their crown drip lines. The fence shall be clearly marked with danger tape. No open fires shall be allowed within this fenced area, nor shall vehicles be parked underneath these trees. The area shall not be used for material storage or as allocation for temporary buildings. No heavy equipment, machinery and vehicles may be parked under any tree	Contractor / Resident Engineer /ECO	Pre-construction (planning and development)	
			• The contractor shall place any camps that may be required for himself and his employees only at sites approved by the project manager / ECO. No trees or bushes shall be damaged or cut down by anyone for use on the works or otherwise, without the written consent of the ECO / Project manager and then only where and in the manner as they may direct.	Contractor / Resident Engineer/ Project manager /ECO	Pre-construction (planning and development) and construction	
			• Identify all areas likely to be affected by construction and produce a plan showing the positions of all buildings, lay down yards, vehicle wash and service areas, fuel storage areas, batching areas and other infrastructure for the approval by the ECO/ Resident Engineer / project manager	Resident Engineer / ECO/ Project manager	Pre-construction (planning and development) and construction	
			• Establish special protective measures for sensitive areas, implement and thereafter monitor compliance: - Retain natural trees and grass species as far as possible - Retain trees up to a (safe) distance from road verges and future structures (do not clear liberally) - Where tree and woody material has to be felled, stockpile material for later redistribution over reinstated top soiled areas - No vegetative matter shall be randomly burnt on site	Contractor, ECO	Pre-construction (planning and development) and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• The contractor shall arrange for Environmental Awareness / Training programme for the personnel on site, to the satisfaction of the ECO / proponent	Contractor / ECO	Pre-construction (planning and development) and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
3	Workshops, storage areas and materials handling	Water pollution, air pollution, etc.	• Storage areas for potentially contaminating materials shall be roofed with impervious material. The ingress of wind-blown rain shall be avoided by sufficient roof overhang or sides of sufficient height.	Contractors		
			• Storm water shall be diverted around the storage area. Uncontaminated storm water to be discharged directly to receiving urban stream.	Contractors		
			• Proper storage facilities, placed on an impermeable surface, shall be provided for the storage of oils, grease, fuels, chemicals and other hazardous materials to be used during the construction phase of the activities. Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel shall be avoided. An adequate bund wall, 125% of volume, shall be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil.	Contractors		
			• Hazard signs indicating the nature of stored materials shall be displayed on the storage facility or container. Before containers or storage facilities are erected, the contractor shall furnish the ECO with details of the preventative measures he proposes to instate in order to mitigate pollution of the surrounding environment from leaks or spillage. The preferred method is a concrete floor that is bunded. The proposal shall also indicate the emergency procedures in the event of misuse or spillage that may negatively affect an individual or the environment.	Contractors		
			• The storage facilities (including any tanks) shall be surrounded by a bund wall, in order to ensure that accidental spillage does not pollute local soil or water resources.	Contractors		
			• The storage areas shall not be utilised for accommodation purposes.	Contractors		
			• The storage areas shall be kept tidy and the area shall be rehabilitated after use.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• An inventory of any hazardous chemicals/substances (including that within equipment) kept on site (together with all MSDS's), along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, shall be kept in the storage area as well as by the appropriate manager. These areas shall be securely fenced.	Contractors		
			• Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.	Contractors		
			• A notice board with the contact details of the responsible party shall be displayed at the gate to the storage area.	Contractors		
			• The contact details for the ECO and RE shall be kept on site	Contractors / ECO		
			• The contractor shall ensure that any delivery drivers are informed of all procedures and restrictions required to comply with the EMP. Delivery drivers shall be supervised during off loading by someone with an adequate understanding of the EMP.	Contractors		
			• Any new facilities shall be constructed as far as possible in areas that are already disturbed.	Contractors		
			• Refuelling and maintenance of vehicles shall occur within specified depots only. Working / fuel transfer areas within these depots shall be underlain by an impermeable surface and shall have grease traps to ensure that no spillage of greases, oils or fuels occurs into local soil or water resources.	Contractors		
			• All repairs done on machinery that makes use of hydrocarbons as fuels or lubricants shall be carried out on a concreted surface, and will make use of a drip tray placed strategically to avoid incidental spillage.	Contractors		
			• Drip trays shall be inspected and emptied daily and serviced when necessary. In particular drip trays shall be closely monitored during rain events to ensure that they do not overflow. The contractor shall maintain a used oil storage container that will be within an appropriately bunded area.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Workers shall be made aware of the health risks associated with any hazardous substances used (e.g. smoking near refuelling depots), and shall be provided with appropriate protective clothing / equipment in case of spillages or accidents.	Contractors		
			• Cement and other potential environmental pollutants shall be stored and mixed on an impermeable substratum. There shall be no opportunity for environmental contamination.	Contractors		
4	Contamina-ted water	Water pollution	• The contractor shall prevent discharge of any pollutants, such as cement, concrete, lime, fertiliser, chemicals and fuels into any water sources or soils.	Contractors		
			• "Grey water" from kitchens, showers, sinks, etc. shall be diverted to, and treated at the sewage treatment facility.	Contractors		
			• Runoff from fuel depots, workshops, truck washing areas and concrete swills shall be routed through an oil trap equipped with oil recovery equipment. The remaining water will be discharged, through a sediment trap, as agreed with the ECO and Resident Engineer.	Contractors / ECO/ Resident Engineer		
5	Waste management	Solid waste	• Solid waste shall be stored in an approved area in covered, tip and animal - proof metal drums, preferably skip containers, for collection and disposal.	Contractors		
			• The waste collection point shall be fenced off with diamond mesh wire with a minimum height of 1, 8 meter. The fence needs to keep out all animals, above and below ground level.	Proponent and ECO	Beginning of construction phase	
			• A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the ECO. Any illegal dumping of waste will not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect will be closely monitored and reported on; proof of legal dumping must be able to be produced on request.	Proponent	Beginning of construction phase	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Disposal of solid waste shall be at a Department of Environmental affairs (DEA) licensed landfill site or at a site approved by DEA in the event that an existing operating landfill site is not within reasonable distance from the site. No waste to be dumped elsewhere that at permitted landfill site in the operational phase.	Contractors / proponent	Including operational phase	
			• No waste shall be burned at the site offices or anywhere else on the site, including the approved solid waste disposal site.	Contractors		
			• All building rubble shall be a) removed from the site and disposed of at an appropriate dumping site, or b) temporarily stored in a clearly demarcated area on site for future use.	Contractors		
		Litter	• No littering by construction workers shall be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter.	Contractors		
			• The contractor shall provide enough rubbish bins / skips for later safe disposal at approved sites.	Contractors		
			• Littering, discarding or burying of any materials shall not be allowed on site.	Contractors		
		Hazardous waste	• Hazardous waste such as tar and oil shall be disposed of at a DEA approved hazardous waste site, or through a registered hazardous waste management company. Special care shall be taken to avoid spillage of tar products such as tar prime or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and returned to the supplier. Water and oil shall be separated in an oil trap. Oils collected in this manner shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at an approved hazardous waste disposal site. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.	Contractors		
			• Hazardous waste shall be removed from the site and adequately disposed of.	Contractors/ ECO		
		Recycling	• Wherever possible, materials used or generated by construction shall be recycled or reused.	Contractors		
			• Where possible and practical, such as at stores and offices, waste shall be sorted for recycling purposes, into the following categories: paper, aluminium, metals (other than aluminium), organic waste and glass.	Contractors		
			• Separate containers for glass, paper, metals and plastics shall be provided. Office and camp areas are particularly suited to this form of recycling process.	Contractors		
6	Soil management	Topsoil	• Topsoil comprises the natural soil-covering, including all the vegetation and organic matter within the upper soil layer. For the purposes of the EMP, topsoil will refer it to all usable soil within the A and B soil horizons. The depth of the topsoil may vary at each site. Wherever possible all usable topsoil shall be stripped. Topsoil shall be removed from all areas where physical disturbance of the surface will occur. Topsoil shall be stripped and stockpiled for later re-use. Soil stripping should be done in a phased manner to retain the vegetation cover for as long as possible.	Contractors	Vegetation clearing phase	
			• All topsoil stockpiles shall be maintained in a weed-free condition throughout the contract period. Weeds appearing on the stockpiled topsoil shall be removed by hand before the weeds seed.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• All stockpiles shall be hand seeded within 3 weeks with a specified grass seed mixture.	Contractors and ECO		
			• No large vegetation (trees and large shrubs) to be damaged or removed to allow for the stockpiling.	Contractors		
			• Should any fuel, oil or hydraulic fluids be spilled onto the soils, the extent of soil contamination shall be determined and polluted soil shall be removed to an approved disposal site and the area shall be rehabilitated.	Contractors		
			• Ensure all usable soil is stripped and correctly stockpiled for later use in rehabilitation and specific landscape needs.	Contractors	Vegetation clearing phase	
			• All soil stockpiles shall be located at a suitable site defined by the ECO.	Contractors		
			• Stockpiled soil shall be located away from drainage lines and areas of temporary inundation by water. Any material removed from the in stream or riparian habitat may not be stored within the riparian zone. It may not be stored in such a way that will cause damming of water or wash-away.	Contractors		
			• Soil contaminated by hazardous substances shall be disposed of at an approved DEA waste disposal site.	Contractors		
			• Topsoil stockpiles shall be stored, shaped and sited so that they do not interfere with the flow of water to cause damming or erosion, or be eroded by water. The contractor shall ensure that no, or minimal topsoil is lost due to erosion. Topsoil stockpiles shall not exceed a height of 2m. If soil is stored for longer than six months, a full analysis of the soil chemical properties shall be under taken on soil fertility status amended as required, under direction of a soil scientist.	Contractors and ECO		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Areas shall be systematically rehabilitated with topsoil and grassed to allow for quick cover. The contractor will be held responsible for the replacement, at his own cost, of any unnecessary loss of topsoil. The contractor will also be responsible for the clearing of drainage or water systems within and beyond the boundaries of internal roads that may have been affected by such negligence.	Contractors		
			• Topsoil shall either be used to stabilise road verges, for landscaping purposes or be disposed of appropriately.	Contractors		
			• All topsoil stockpiles shall be located in a designated area. Repeated handling of the soil must be avoided, and soil should not be handled when wet as this will precipitate compaction.	Contractors		
		Subsoil	• The subsoil is the layer of soil immediately beneath the upper usable soil layer (the A and B soil horizon). This layer is typically C Horizon material. The subsoil shall be removed to a depth instructed by the environmental manager and the ECO, and stored separately from the topsoil. The subsoil shall be replaced in the original order it was removed for rehabilitation purposes.	Contractors		
		Soil erosion	• Areas that may be prone to erosion or where signs of erosion are evident (e.g. water trenches) shall be stabilised. Methods of stabilisation include: brush-cut packing, mulch or chip cover, straw stabilising, sodding, hydro-seeding, soil binders and physical stabilisation methods including gabions, reno-mattresses, armour flex or retaining walls.	Contractors		
			• Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ECO.	Contractors		
			• All presently eroded areas within the construction site shall be rehabilitated to a state comparable to the surrounding vegetation	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• To prevent soil erosion, ensure storm water is diverted away from exposed areas and soil stockpiles. Ensure storm water runoff from exposed areas and un-vegetated soil stockpiled passes through settling ponds to trap sediment prior to the water flowing off site.	Contractors		
7	Drainage	Water pollution and soil erosion	• The quality, quantity and flow direction of any surface water runoff shall be established before disturbing any area for construction purposes. Cognisance shall be taken of these aspects and be incorporated into the planning of all construction activities. Before the commencement of any activities, it shall be established how the activities will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the activities. No water source shall be polluted by the construction activities, including the release of sediment into water courses.	Contractors		
			• The urban stream shall be protected from erosion, direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.	Contractors		
			• Storm water falling on the denuded area shall be directed off the area in a manner that minimises erosion.	Contractors		
			• Storm water falling on denuded areas shall be directed through sediment control dams. The sediment control dams shall be cleared on a regular basis to ensure that they have adequate containment capacity	Contractors and ECO		
			• "Clean" storm water shall be diverted around the area so that it does not become contaminated.	Contractors		
			• Contaminated water discharged from the construction site shall meet the required Department of Water Affairs (DWA) water quality standards.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
8	Spillages	Water, surface and air pollution	• The urban stream shall be protected from direct or indirect spillage of pollutants. Pollutants could include the following: refuse, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage, the contractor (and ECO) shall arrange to clean the affected area properly.	Contractors		
			• Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice shall be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input will be agreed with the ECO. The costs of containment and rehabilitation will be for the contractor's account, including the costs of specialist input.	Contractors		
			• Spilt material shall be removed and disposed of in an acceptable manner.	Contractors		
			• The Contractor is responsible for spill treatment. The individual responsible for, or who discovers a hazardous waste spill, shall report the incident to the ECO. The ECO will assess the situation and act as required. In all cases, the immediate response will be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the ECO. Areas cleared of hazardous waste shall be re-vegetated according to the ECO's instructions. Spill kits to be made available on site for minor spill treatment and also containment. The contractor shall report spill incidents to the ECO within 4 hours of its occurrence and the ECO shall report it to DWA within one working day	Contractors and ECO		
9	Areas of specific importance	Depletion of natural resources	• Any sensitive areas shall be adequately demarcated during construction and shall not be disturbed in any way. These are the areas outside the demarcated footprint of the envisaged development. Penalties shall apply for the non adherence of any of these areas.	ECO and Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• The specific construction area shall be clearly demarcated, preferably with red and white tape. All vehicles and activity shall be confined to these demarcated construction areas, in order to minimise environmental damage to the surrounding natural vegetation. Sensitive and no-go areas will be clearly explained to workers during the induction programme. Workers shall be instructed to stay clear of these sensitive and no-go areas.	ECO and Contractors		
10	On site urban stream	Water pollution and sedimentation	• Disturbance in the vicinity of the urban stream shall be restricted. Pollution of any watercourse by an on-site activity shall be confined and cleaned up by the contractor or a clean-up organisation, to the satisfaction of the ECO. The costs, in terms of the National Water Act, Act No 36 of 1998, will be the responsibility of the contractor.	Construction and ECO		
			• Adequate sedimentation and flow control measures, e.g. reno mattresses or stone baskets, shall be enforced where excavations or disturbance of drainage lines or a wetland may occur.	ECO and Contractors		
			• Impediments to natural water flow at drainage lines shall be avoided, or, if unavoidable, drains or culverts shall be constructed to avoid damming or ponding.	Contractors		
			• Water for construction and drinking purposes shall be obtained from a sustainable source. The ECO shall indicate to the contractor which sources of water may be used for potable usage and washing. The contractor shall ensure that water is drawn from a sustainable source that shall not result in depletion of existing water supply to the aquatic ecosystem.	Contractors		
			• The contractor shall not cause any physical damage to any aspects of a watercourse, other than that necessary to complete the works as specified.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• The ECO shall define baseline water quality of the urban stream rivers on the site. These baseline values shall not be adversely affected by construction-related activities.	ECO and contractor	Immediately after approval of EMP	
11	Noise control	Noise pollution	• The contractor shall endeavour to keep noise and vibration generating activities to a minimum. The 45dBA noise contour (measured from the property boundary) as determined for rural districts in terms of SANS:10103, Table 2, may not be exceeded. Noise levels at possible sensitive receptors (e.g. neighbouring houses) should be measured frequently and should stay within acceptable levels. Noisy activities that could cause a major disturbance, for example, blasting, shall only be done during daylight hours, or unless otherwise approved by the ECO. Should noise-generating activities have to occur at night, for example drilling, people living in the vicinity of the site shall be warned about the activity well in advance. Compliance with the appropriate noise legislation is mandatory.	ECO and Contractors		
			• All construction vehicles and machinery used on site shall be kept in good repair to prevent unnecessary noise.	Contractors		
			• Construction activities shall be restricted to working hours (06h00 – 18h00) seven days a week, unless otherwise approved by the ECO in consultation with the affected landowner(s).	Contractors		
12	Dust control	Air pollution	• The contractor shall be responsible for the control of dust arising from the operations and for any costs against the employer for damages resulting from the dust.	Contractors		
			• The contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the ECO.	Contractors		
			• Dust on all roads on site shall be controlled by implementing dust suppression, such as using water spray vehicles, the use of a Rain Bird or similar water spray method.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Water used for dust suppression shall be used in quantities small enough not to generate run-off and cause erosion. Wherever possible water that has been captured in sediment control dams/silt traps will be used for dust suppression in preference to using clean water from streams or dams in the area	Contractors		
			• The removal of vegetation shall be avoided until such time as soil stripping is required and similarly exposed surfaces shall be re-vegetated or stabilised as soon as is practically possible.	Contractors		
			• Excavation, handling and transport of erodible materials shall be avoided under high wind conditions.	Contractors		
			• Where possible, soil stockpiles shall be located in sheltered areas where they are not exposed to the erosive effects of the wind. Where erosion of stockpiles becomes a problem, erosion control measures shall be implemented at the discretion of the ECO.	Contractors		
			• Regular visual monitoring of air quality with respect to particulates and dust fall shall be undertaken	ECO, Proponent		
			• Vehicle speeds shall not exceed 30km/h when manoeuvring on site.	Contractors		
13	Indigenous and alien vegetation	Invasion of alien species	• Only vegetation falling directly in the demarcated access routes shall be removed where necessary after consultation with the ECO. A principle to follow is where a single indigenous tree species is felled; two new trees shall be planted in accordance with the vegetation of the surrounding area.	Contractors		
			• All trees to be retained within the construction area shall be clearly indicated on a site plan (master plan) and demarcated.	ECO and landscape architect		
			• Demarcation shall remain in place for the duration of works on site. If damaged, demarcation shall be repaired or replaced immediately.	Contractors		
14	Fire prevention	Depletion of natural	• The outbreak of an uncontrolled fire shall be reported to the ECO immediately and the necessary steps shall be taken to control and extinguish the fire.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
	and control	resources or harm to humans and infrastructure	• A firebreak must be developed and maintained around the construction and surrounding areas.	ECO		
			• Smoking shall be prohibited in the vicinity of flammable substances.	Contractors		
			• Open fires for heating and cooking shall not be permitted.	Contractors		
			• The contractor shall ensure that fire-fighting equipment is available on site, in particular where flammable substances are being stored or used.	Contractors		
			• Any welding or other sources of heating of materials shall be done in a controlled environment and under appropriate supervision, in such a manner as to minimise the risk of fires and/or injury to staff.	Contractors		
			• The contractor shall be held responsible for any damage caused as a result of fires caused by their employees or sub-Contractors.	Contractors		
15	Access	Depletion of natural resources	• Transport routes, to and within the site and construction areas shall be clearly demarcated prior to use. Any deviations from the principle road plan must be cleared with the ECO	Contractors and ECO		
			• All rehabilitation and associated activities shall be confined to the identified site. Access to the site shall be controlled such that only vehicles and persons directly associated with the work at a particular site have access.	Contractors		
			• Workers shall be instructed about safety on site and the consequences of entering on neighbour's properties	Contractors		
			• Ensure contractor's staff arrive and depart promptly to prevent loitering of contractor's staff outside the designated working hours.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• All personnel and vehicles used for transportation and/or construction purposes shall remain within these demarcated routes and areas, i.e. vehicles shall not be allowed to drive randomly across sensitive areas (demarcated with red and white bunting), but shall remain within the approved routes. The purpose of this measure is to: a) limit unnecessary compaction of topsoil; and b) prevent disturbance of vegetation outside the construction areas.	Contractors		
			• Access during the operational phase to be controlled	Proponent	Operational	
16	Consultation with Interested and Affected Parties		• Open liaison channels shall be established between the Proponent, the Contractors and Interested and Affected Parties, so that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s).	ECO, Proponent, Contractors		
			• The ECO shall establish a complaints register to record / register all complaints relating to the Activities. The ECO shall develop a protocol relating to the steps that would be followed once a complaint has been received. The protocol shall cover at least the following steps: registration, investigation, reporting, follow-up action and close out. This protocol shall be maintained by the operator once the Activity is operational.	ECO		
17	Creation of employment opportunities		• The criteria for and selection of Contractors and their labourers for the project shall demonstrate preference for the local communities. Such requirements shall be included in contract documents.	Contractors		
18	Record Keeping, Compliance and Penalties	Transgres-sion of EMP measures, statutes and laws	• The ECO will continuously monitor the contractor's adherence to the EMP and will issue the contractor with a notice of non-compliance whenever transgressions are observed. The ECO will record the nature *and magnitude of the non-compliance* in a register, the *action taken to discontinue* the non-compliance, the *action taken to mitigate its effects* and the *results* of the actions.	ECO		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.	ECO		
			• The contractor shall act immediately when a notice of non-compliance is received and implement the agreed corrective action.	Contractors		
			• Any avoidable non-compliance with the above-mentioned measures will be considered sufficient ground for the imposition of a penalty. **The value of the penalty will not be less than the payment that would have been due to the contractor for the day's production of the relevant item of work that gave cause for the infringement.** Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner in which the environment is managed. Set penalties should be enforced.	ECO and Contractors		
			• Failure to rectify the cause will be reported to the relevant authority to deal with the transgression, as it deems fit.	ECO		
19	Health and safety	Health and safety related incidents	• All the necessary handling of safety equipment required for the safe use of petrochemicals and oils shall be provided by the contractor to, and used or worn by, the staff whose duty it is to manage and maintain the contractor's and his subcontractor's equipment.	Contractors		
			• Workers shall be equipped with adequate personal protective equipment (PPE), e.g. equipment providing protection from the sun.	Contractors		
			• Hazardous materials shall be transported, stored, used and disposed of in the correct manner, as discussed under section 5.	Contractors		
			• Any worker working above an open water body must wear a flotation device and there must be a flotation device available next to any open water body.	Contractors		
			• The drivers will adhere to the speed limit and the rules of the road.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• The drivers will reduce speed and exercise caution on the access road to the activity.	Contractors		
			• The contractor shall maintain and update all safety records.	Contractors		
20	Emergency issues		• The ECO shall define emergency reporting procedures for the development.	ECO		
			• Adopt standard emergency reporting procedures.	Contractors		
			• Ensure that all personnel are aware of emergency reporting procedures and their responsibilities.	ECO and Contractors		
			• Ensure immediate clean up of any spills in accordance with relevant legislation.	ECO and Contractors		
			• Telephone numbers of emergency services, including the local fire fighting service, shall be conspicuous.	ECO and Contractors		
21	Landscaping and rehabilitation	Depletion of natural resources	• Once construction, closure or rehabilitation has been completed, all redundant infrastructure, waste and construction materials shall be removed from site by the contractor and disposed of in an appropriate manner, i.e. at a registered DEA waste site.	Contractors	After completion of the construc-tion, closure or rehabilitation phases	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Plants that are indigenous shall be used for rehabilitation.	ECO	During and after completion of the construc-tion closure or rehabilitation phases	
			• Vegetative cover shall be encouraged to take place in as short a time as possible.	ECO	During and after completion of the construc-tion, closure or rehabilitation phases	
			• Areas compacted by vehicles during construction shall be scarified or ripped, if necessary, to allow penetration of plant roots and the re-growth of natural vegetation if outside the boundaries of the site footprint.	ECO	During and after completion of the construc-tion closure or rehabilitation phases	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Stockpiled topsoil (not higher than 2 meters) shall be used as the final cover for all disturbed areas where re-vegetation is required.	ECO	During and after completion of the construc-tion closure or rehabilitation phases	
			• The vegetation used for rehabilitation purposes and the cover density shall aim to limit soil erosion.	ECO	During and after completion of the construc-tion closure or rehabilitation phases	
22	Storm water management	Soil erosion	• The access roads shall have storm water drainage channels to prevent soil erosion.	Proponent and Contractors		
			• Provide suitable routing for contaminated storm water from the individual facilities to the respective areas where uncontaminated storm water will be routed into the urban stream	Proponent and Contractors		
23	Water for human consumption	Depletion of natural resources	• The contractor shall ensure the provision and proper utilisation, maintenance and management of toilet, wash and waste facilities. Toilet facilities supplied by the contractor for the workers shall occur at a minimum ratio of 1 toilet per 15 workers. The exact location of the toilets shall be approved by the ECO prior to establishment. All temporary / portable toilets shall be secured to the ground to the satisfaction of the ECO to prevent them from toppling due to wind or any other cause.	Contractors		
			• The contractor shall ensure proper supervision of employees at all times.	Contractors		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
24	Cooking fuel	Depletion of natural resources	• The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings.	Contractors		
			• The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes. No natural materials may be harvested and burned for the use of cooking.	Contractors		
			• No fires shall be allowed on site by Contractors or labourers.	Contractors		
25	Training of Contractors and labourers		• As part of the induction programme, staff shall be educated as to the need to refrain from destruction of animals and plants, as well as from indiscriminate defecation, waste disposal and/or pollution of local soil and water resources, from trespassing on surrounding private property and from theft of any material and animals from surrounding private property. Immediate and decisive action shall be taken should this occur.	ECO and Contractors		
			• As mentioned earlier, machine / vehicle operators shall receive clear instructions to remain within demarcated access routes and construction areas.	Contractors		
26	Fire safety	Occurrence of fires	• A clear fire emergency and response plan to be drafted for purposes of all phases of the envisaged development. The necessary fire extinguishing equipment and infrastructure to be incorporated into the development	Proponent and home owners		

MITIGATION MEASURES: SPECIFIC.

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
27	Terrestrial aspects	Terrestrial and aquatic impacts	• The development zone should be demarcated with danger tape and Contractors informed that no access to areas outside of this zone is allowed	ECO	Pre-construction	
			• The environmental control officer should be present on site, particularly during initial site clearing operational, in order to monitor whether the Environmental Management Plan is being adhered to.	ECO	Pre-construction and construction	
			• In order to comply with the Conservation of Agricultural Resources Act, all listed invasive exotic plants should be targeted and controlled. The riparian zone should be particularly targeted for control.	ECO/Contractors	Construction and Operational	
			• During the operational phase the control of the listed invasive plants according to the Conservation of Agricultural Resources Act should remain the responsibility of the property owner	Property Owner /Proponent	Operational	
			• The environmental control officer should monitor whether invasive and alien species are being removed or not. Bare soil surfaces that have been strip-cleared should be monitored for invasion by exotic species.	ECO	Construction	
			• Building Contractors should be made aware of the necessity to dump any building off-site at an appropriate landfill site.	Contractors	Pre-construction and construction	
			• The environmental control officer should search surrounding ecologically sensitive vegetation to check whether building Contractors are dumping any building rubble on site or not	ECO	Construction phase	
			• Penalties should be levied on any contractor who does not comply	Proponent/ Resident Engineer	Pre-construction and construction phase	
			• All topsoil removed during clearing of roads and housing footprints should be stockpiled for later use such as landscaping gardens and / or rehabilitating disturbed areas.	Contractor/ Resident Engineer/ ECO	Construction and operational	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• If access roads are not to be tarred immediately, then any steep road surfaces should have water-traps and drainage furrows constructed in order to direct water off the road as quickly as possible.	Contractor / Resident Engineer/ ECO	Construction phase	
			• Cut off drains diverting storm water around the perimeter of the development should be professionally designed to handle expected run-off and to prevent erosion	Resident Engineer	Pre-construction and Construction	
			• Outflow from cut-off drains and storm water diversions should be attenuated sufficiently to prevent erosion of the receiving environment.	Resident Engineer	Construction and Operational	
			• Maintain the culverts in the area where the urban stream occurs and preventing the inflow of silt into the stream by means of silt traps located close to the stream in order to prevent siltation. These option will aid in preventing the occurrence of flooding in the area	Proponent		
			• Preventing the inflow of grey water and sewage water into the urban stream by maintaining the site infrastructure and checking the efficiency of service infrastructure regularly	Proponent		
			• Storm water to be routed adequately into the urban stream by preventing erosion and maintaining the storm water infrastructure so that blockages can be prevented	Proponent		

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
28	Geotechnical	Geotechnical impacts	• Potentially unstable areas (NHBRC Manual (February 1999) - Rating 3) (wet/damp soils) are to be considered for development. Earthworks should be carefully controlled and supervised to prevent the creation of an unstable situation.	Resident Engineer	Pre-construction	
			• Materials exposed in foundation excavations should be carefully examined with a view to identifying localized zones of weakness and implementing appropriate stabilizing measures.	Resident Engineer	Pre-construction	
			• Wherever possible, over-steep cut and fill banks (borrow pit areas) should be battered back to a more suitable grade (filled).	Resident Engineer	Construction	
			• For site class S. Estimated total settlement: 10mm. Construction type: Normal. - Normal construction (strip footing or slab-on-the-ground foundations. - Good site drainage to be implemented	Resident Engineer / Contractors	Pre-construction and construction	
			• For site class S1. Estimated total settlement: 10 - 20 mm. Construction type: Modified normal - Reinforced strip footings - Articulated joints at some internal and all external doors - Light reinforcement in masonry - Site drainage and service / plumbing precautions - Foundation pressure not exceeding 50kPa • For site class S1. Estimated total settlement: 10 - 20 mm. Construction type: Compaction of in situ soils below individual footings	Resident Engineer / Contractors	Pre-construction and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			- Remove in situ material below foundations to a depth and width of 1.5 times the foundation width or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content. - Normal construction with lightly reinforced strip foundations and light reinforcement in masonry • For site class S1. Estimated total settlement: 10 - 20 mm. Construction type: Deep strip foundations - Normal construction with drainage requirements - Founding on a competent horizon below the problem horizon • For site class S1. Estimated total settlement: 10 - 20 mm. Construction type: Soil raft - Remove in situ material to 1.0 m beyond the perimeter of building to a depth and width of 1.5 times the widest foundation or to a competent horizon and replace with material compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content - Normal construction with lightly reinforced strip footings and light reinforcement in masonry	Resident Engineer / Contractors	Pre-construction and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• For site class S2. Estimated total settlement: > 20 mm. Construction type: Stiffened strip footings, stiffened or cellular raft - Stiffened strip footing or stiffened or cellular raft with articulation joints or solid lightly reinforced masonry - Bearing pressure not to exceed 50kPa - Fabric reinforcement in floor slabs - Site drainage and service / plumbing precautions • For site class S2. Estimated total settlement: > 20 mm. Construction type: Deep strip foundations - As for S1, but with fabric reinforcement in floor slabs • For site class S2. Estimated total settlement: > 20 mm. Construction type: Compaction of in situ soils below individual footings - As for S1 • For site class S2. Estimated total settlement: > 20 mm. Construction type: Piled or pier foundations - Reinforced concrete ground beams or solid slabs on piled or pier foundations - Ground slabs with fabric reinforcement - Good site drainage should be implemented • For site class S2. Estimated total settlement: > 20 mm. Construction type: Soil raft - As for S1	Resident Engineer / Contractors	Pre-construction and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• For site class H. Estimated total settlement: < 7.5 mm. Construction type: Normal - Normal construction (strip footing or slab-on-the-ground foundations) - Good site drainage and service / plumbing precautions recommended	Resident Engineer / Contractors	Pre-construction and construction	
			• For site class H1. Estimated total settlement: 7.5 - 15 mm. Construction type: Modified normal - Lightly reinforced strip footings - Articulation joints at all internal / external doors - Light reinforcement in masonry - Site drainage and service / plumbing precautions • For site class H1. Estimated total settlement: 7.5 - 15 mm. Construction type: Soil raft - Remove in situ material to 1.0 m beyond the perimeter of the structure and replace with inert backfill, compacted to 93% MOD AASHTO density at -1% and +2% of optimum moisture content - Normal construction with lightly reinforced strip footings and light reinforcement in masonry if residual movements are <7.5mm, or construction type appropriate to residual movements - Site drainage and plumbing / service precautions	Resident Engineer / Contractors	Pre-construction and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• For site class H2. Estimated total settlement: 15 - 30 mm. Construction type: Stiffened or cellular raft - Stiffened or cellular raft with articulation joints or lightly reinforced masonry - Site drainage and plumbing / service precautions • For site class H2. Estimated total settlement: 15 - 30 mm. Construction type: Piled construction - Piled foundations with suspended floor slabs with or without ground beams - Site drainage and plumbing / service precautions • For site class H2. Estimated total settlement: 15 - 30 mm. Construction type: Split construction - Combination of reinforced brickwork / block work and full movement joints - Suspended floors of fabric –reinforced ground slabs acting independently from the structure - Site drainage and plumbing / service precautions • For site class H2. Estimated total settlement: 15 - 30 mm. Construction type: Soil raft - As for H1	Resident Engineer / Contractors	Pre-construction and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• For site class H3. Estimated total settlement: > 30 mm. Construction type: Stiffened or cellular raft - As for H2 • For site class H3. Estimated total settlement: > 30 mm. Construction type: Piled construction - As for H2 • For site class H3. Estimated total settlement: > 30 mm. Construction type: Soil raft - As for H1	Resident Engineer / Contractors	Pre-construction and construction	
			• The amount of filling to be carried out will be restricted to the areas of disturbance. However, where the need arises, the placement of fills should be preceded by the removal of all natural vegetation. The fill should then be constructed in layers not exceeding 300mm loose thickness, each layer being compacted prior to the placement of the subsequent layer.	Resident Engineer / Contractors	Pre-construction and construction	
			• Any existing fill banks should be battered back and compacted as much as possible to improve their stability. They should be grassed to aid in erosion prevention and drainage must be in place around the rehabilitated sites.	Resident Engineer / Contractors	Pre-construction and construction	
			• Due to the slope angle and the sandy nature of the colluviums covering the site, good water management practice must be employed to prevent erosion, especially after vegetation has been cleared. Silt traps to be put in place so also to prevent silt being transported into the stream.	Resident Engineer / Contractors	Pre-construction , construction and operational	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• No soak pits may be used in the area for storm-water disposal. It is essential that all storm-water be carried off the slopes in a controlled manner, in either surface drains or storm-water pipes. Sites should be designed such that storm-water from one site does not cascade down slope over a number of other sites, and storm-water down pipes on structures should not discharge directly onto platform surfaces, but rather storm-water should be carried away from structures in a controlled manner.	Resident Engineer / Contractors	Complete project lifecycle	
			• As waterborne sewage is to be installed in the area, inhabitants must be encouraged to dispose of all waste and washing water into the system, rather than discarding water outside onto platforms or over fill banks. In addition, a concrete paving strip at least 1m wide should be placed around the perimeter of all structures, to prevent the ingress of excess water below foundations.	Resident Engineer/ Contractors	Construction and operational	
			• All foundations must be inspected and signed off by a qualified person before the construction is undertaken.	Resident Engineer / Consulting engineer	Pre-construction and construction	
			• Strict drainage control must be carried out both during and after development of the area, to ensure storm-water runoff onto the roads in the area and to prevent pounding of storm-water. Drainage measures must be installed in the seepage/wet areas if they are to be developed. In addition, the storm-water drains under the main road that runs to the south of the proposed area of development will need to be enlarged and kept clean in order to cope with the additional runoff that will occur once development is completed.	Resident Engineer / ECO/ Contractors	Construction and operational	
			• The excavation of service trenches and the installation of ground services to be conducted preferably during the dry season as shallow groundwater and surface seepage will cause difficulties such as flooded trenches and trench instabilities	Resident Engineer / Contractors	Pre construction and construction	

NO	ASPECT (of Activity, Service or Product)	POTENTIAL IMPACT	MITIGATION MEASURE(S)	RESPONSIBLE PERSON / PARTY	TIME-FRAME (Construction, Operational, Closure and Rehabilitation phases unless stated otherwise)	For ECO Monitoring Purposes only – Successfully Implemented / Corrective action required (To be completed by ECO)
			• Areas of termite and other biotic activity are present and additional foundation modifications to prevent damage to single storey structures due to differential settlements may be necessary across these features.	Resident Engineer / ECO/ Contractors	Pre construction and construction	
			• Good practice to use plastic pipes rather than steel pipes for services as the site soils will be corrosive to steel pipes	Resident Engineer / Contractors	Pre construction and construction	

7. ADDITIONAL MITIGATION MEASURES

The following are mitigation measures forming part of the EMPR as an outcome of the Environmental Authorisation Amendment Process dated August 2015.

The direct, indirect and cumulative impacts have been considered.

7.1. Impacts on flora and fauna biodiversity (B)

Impacts associated include:

B1: Loss of important habitat units within ecosystem
B2: Increase in invasive and alien species cover
B3: Sterilization of soils
B4: Disturbance to wildlife such as avifauna, reptiles etc. mainly due to noise generated by construction activities

Potential impacts

Most of the total footprint falls within transformed and disturbed vegetation communities. According to the latest proposed layout, about 17 000m^2 hectares of vegetation could be transformed by the proposed development. This will impact on the current onsite habitat and lead to destruction of habitat within the ecosystem.

Mitigation:

- An environmental control officer should be appointed.
- No reasonable mitigation found apart from Low-Medium conservation value of vegetation communities for flora. (Pre-construction Phase).
- The development zone should be demarcated with danger tape and contractors informed that no access to areas outside of this zone is allowed. (Construction Phase).
- The environmental control officer should be present on site, particularly during initial site clearing operations, in order to monitor whether this and the Environmental management Plan is being adhered to.

Potential impacts

During pre-construction, construction and operation phases, disturbed soil surfaces will potentially be open to invasion by alien invader species. Such invasions will provide a seed base

from which invasions can take place into adjacent untransformed vegetation and surrounding properties.

Mitigation:

- In order to comply with the National Environmental Management: Biodiversity Act, all listed invasive exotic plants should be targeted, eradicated and controlled throughout the lifecycle of the project. During the operational phase the control of the listed invasive plants according to the National Environmental Management: Biodiversity Act should remain the responsibility of the property owner. (Operational Phase)
- The environmental control officer should spend time on the site and monitor alien species are being removed or not. Bare soil surfaces that have been strip-cleared should be monitored for invasion by exotic species. (Construction Phase).
- Ensure that all imported materials are free of alien vegetation/seed and that all vehicles and machinery are cleaned prior to accessing construction areas.

Potential impacts

During the construction and operational activities the impacts on soils include compaction which could lead to erosion. The establishment of the proposed shopping centre will also sterilize the soils rendering it impossible to host vegetation communities.

Mitigation:

- Erosion and possible sedimentation into the nearby stream needs to be prevented by applying erosion control and sedimentation measures.
- Strict adherence to the recommendations as proposed in the geotechnical assessment completed.
- Implementation of sustainable urban drainage systems as far as possible in the proposed development according to the guidelines published by the Department of Water Affairs.
- All topsoil removed during the construction phase should be stockpiled for later use such as landscaping gardens and / or rehabilitating disturbed areas.(Construction and Operational phases)
- If access roads are not to be tarred immediately, then any inclined road surfaces should have water-traps and drainage furrows constructed in order to direct water off the road as quickly as possible. (Construction Phase)
- Cut off drains diverting storm water around the perimeter of the development should be professionally designed to handle expected run-off and to prevent erosion. (Construction phase).

- Outflow from cut-off drains and storm water diversions should be attenuated sufficiently to prevent erosion of the receiving environment. (Construction and Operational Phase)
- Vegetation stripping must be minimal as possible and disturbed areas must be revegetated as soon as possible after the construction phase (Construction and Operational Phase).

Potential impacts

During construction, the building contractors may dump building rubble into adjacent areas. During the operation phase, home owners may also dump garden refuse over their walls into untransformed areas.

Mitigation

- Building contractors should be made aware of the necessity to dump any building off-site at an appropriate landfill site. (Construction Phase)
- The environmental control officer should search surrounding ecologically sensitive vegetation to check whether building contractors are dumping any building rubble on site or not. (Construction Phase)
- Penalties should be levied on any contractor who does not comply (Construction Phase).

Potential impacts

Most of the total footprint falls within partially disturbed vegetation communities with the area being located inside an urban area with no significant animal taxa occurring in the area. The area is subject to burning in winter months and ongoing disposal of solid and construction waste with an inflow of sewage waste on occasions. There will be limited impacts on animal diversity.

7.2. Impacts on soil/rock and land capability (SL)

Impacts associated include:

SL1: Soil disturbance caused by the removal of vegetation cover

SL2: Destabilisation of soil and soil erosion

SL3: Soil contamination due to spills and leaks of fuel, lubricants and other potential contaminants

Potential impacts

During the construction and operational activities the impacts on soils include compaction which could lead to erosion and subsequent soil disturbance, destabilization.

Soil compaction by heavy duty vehicles and construction equipment may destabilise the soil and lead to soil erosion can potentially occur during construction phase.

Soil contamination due to spills and leaks of fuel, lubricants and other potential contaminants, including possible indiscriminate disposal of solid waste and wastewater can also potentially occur during the construction phase.

Mitigation:

- Erosion and possible sedimentation into the nearby stream needs to be prevented by applying erosion control and sedimentation measures.
- Strict adherence to the recommendations as proposed in the geotechnical assessment completed.
- Implementation of sustainable urban drainage systems as far as possible in the proposed development according to the guidelines published by the Department of Water Affairs.
- All topsoil removed during the construction phase should be stockpiled for later use such as landscaping gardens and / or rehabilitating disturbed areas.(Construction and Operational phases)
- If access roads are not to be tarred immediately, then any inclined road surfaces should have water-traps and drainage furrows constructed in order to direct water off the road as quickly as possible. (Construction Phase)
- Cut off drains diverting storm water around the perimeter of the development should be professionally designed to handle expected run-off and to prevent erosion. (Construction phase)
- Outflow from cut-off drains and storm water diversions should be attenuated sufficiently to prevent erosion of the receiving environment. (Construction and Operational Phase)
- Vegetation stripping must be minimal as possible and disturbed areas must be revegetated as soon as possible after the construction phase (Construction and Operational Phase)
- Areas cleared of vegetation or topsoil must be minimised, and should be rehabilitated immediately on completion of the construction activity (Construction phase).
- The contractor should prevent erosion during construction. It is necessary to keep topsoil separate from the rest of the soil and place topsoil back on top when closing the trenches.
- Stockpiles must not be placed in close proximity to stormwater culverts and stormwater culverts are to remain unobstructed at all times. Stockpile areas should be identified in consultation with the ECO (Construction phase).
- Topsoil should be reinstated and the area revegetated immediately after backfilling the trench to bind the soil. The disturbed area should lightly compacted and prior to being seeded with indigenous grass (i.e., not limited to :*Eragrostis curvula, Digitaria eriantha, Cynodon dactylon* mixture). Where possible, grass species endemic to the area should be used (Construction and rehabilitation phase).

- Areas to be demarcated for storage of equipment and machinery during the construction phase where strict environmental management measures are implemented and executed. Oil spills to be immediately confined and cleaned up and contaminated material disposed off at an appropriate licensed landfill site (construction phase).

7.3. Impacts on water course (WW)

Impacts associated include:

WW1: Impacts on water quality

WW2: Impacts on in-stream flow

WW3: Increased sedimentation

WW4: Flooding and flow alteration

WW5: Disturbance of habitat like refuge pools used by aquatic species

WW6: Alien invasive vegetation encroachment

Potential impacts

Reduced water quality as result of erosion and sedimentation if sediments are allowed to flow downstream – this can have potential impact on biodiversity and functioning of the system (Construction phase).

Reduction or periodic and irregular increase of in-stream flow could affect biodiversity and system functioning (Construction and operational phase).

Erosion arising from construction activities can affect the hydrological functioning and biodiversity of the system.

Potential flooding in the summer rainfall months (construction and operational phases).

Taxa requiring a rocky substrate clear of sediment and taxa requiring fast clear flowing water free of suspended solids are likely to be most susceptible to increased sedimentation (Construction phase).

Alien invasive vegetation encroachment during the construction phase predominantly.

Mitigation

- Disturbance to the stream and its associated riverine habitat should be avoided and the site clearly demarcated so that no construction activities enters the 1:100 year floodline of the stream.
- Construction activities should be kept within the boundary of the proposed development and not entering the 1:100 year floodline
- Reprofile area to ensure that no changes to runoff patterns occur (construction phase)
- Adequate stormwater management must be incorporated into the design of the proposed development in order to prevent erosion together with the implementation on sustainable urban drainage system measures (construction and operational phase).
- The contractor should re-profile the disturbed area to ensure that no changes to runoff patterns occur (construction phase).
- The contractor should ensure that alien vegetation is controlled in disturbed areas after construction is completed. This would require:
- Preventing fires within the development footprint
- Alien invasive plants to be eradicated and controlled
- In order to minimise the duration of impacts on the system, the contractor should limit the time during which potential sedimentation takes place.
- During the construction phase, no vehicles should be allowed to indiscriminately on the site and not in the 1:100 year floodline.
- Where necessary, and if in close proximity to a stream or river, berms will be constructed along the construction right of way to minimise sediment being washed into the watercourse.
- Any water released from the construction area to the natural water body will be treated suitably prior to discharge, for example, water from trench dewatering may be filtered through hay bales to remove sediment where appropriate. Adequate measures to be implemented where required for settling of sediments during the construction phase.
- Where necessary, storm water from upstream will be diverted around the construction sites to limit the volumes of water flowing through the site, becoming contaminated and adding to erosion (construction phase).
- All machinery and substances used on the site should be checked for leaks and otherwise properly maintained. Where leaks are found, immediate action should be taken to stop the leaks. All contamination from leaks should be immediately removed and remediated (Construction phase).
- Annual water quality monitoring (including bio-monitoring) to take place to monitor the quality of the water.

7.4. Impacts of litter, waste and spoil (W)

Impacts associated include:

W1: Littering arising from domestic and construction waste

W2: Contamination of soil or water due to the inappropriate disposal of domestic waste

W3: Lack of ablution facilities and spillage of petroleum products and spent engine oil arising from the maintenance work

W4: Increased siltation

Potential impacts

Littering arising from domestic and construction waste (Construction and operational phase).

Contamination of soil or water due to the inappropriate disposal of domestic waste (Construction and operational phase).

Lack of ablution facilities and spillage of petroleum products and spent engine oil arising from the maintenance work on construction vehicles.

Increased siltation caused by the inappropriate storage and disposal of construction spoil.

Mitigation

- Excess excavated material (spoil) should not be allowed to accumulate on site and should be disposed of at a registered waste disposal site, approved quarry/disposal site or spoiled at a site deemed appropriate by the Environmental Control Officer (ECO).
- No domestic or building waste is to be buried or burned on site.
- The contractor must provide appropriate and allowed number of ablution facilities for workers.
- The contractor should ensure appropriate measures to prevent the spillage of cement, oil and diesel.

7.5. Nuisance impacts and impact on amenity (N)

Associated impacts:

N1: Increase in dust

N2: Increased noise during construction personnel,

N3: Visual impact and reduced aesthetics of construction activities

Potential impacts

Increase in dust as a result of soil excavation and stockpiling of soil. Windblown dust may pose a nuisance to nearby landowners and residents (construction phase).

Noise that will be generated by construction personnel, vehicles and machinery and drilling may be intrusive to the nearby landowners and residents.

Visual impact and reduced aesthetics of construction activities (including equipment, dust plume, littering etc.) on the local landscape.

Mitigation

- Excavated topsoil should be stored in stockpiles separately from subsoil and protected from wind and water erosion.
- Implement dust suppression measures whenever excessive dust is generated (e.g. dampening with water from municipal source).
- Construction activities that are likely to result in noise levels in excess of 7 dB above ambient noise, at a distance of 100m from the sources should be restricted to normal working hours (i.e. 08h00 to 17h00 Monday to Friday) according to the Noise Control Regulations in terms of the Environmental Conservation Act (Act 73 of 1989) to reduce the noise impact to an acceptable level.
- The contractor should ensure that municipal regulations relating to noise generation are observed.
- Equipment should be well serviced and fitted with silencers where appropriate.

7.6. Impact on existing services and infrastructure (SS)

Associated impacts

SS1: Increase in sewage and greywater treatment

Potential impacts

During the operational phase additional sewage and greywater will have to be treated by the local municipality.

Mitigation

- Ensure that services and infrastructure for sewage and greywater treatment is adequate to prevent domestic waste from entering the stream located on site.

7.7. Impact on traffic (T)

Associated impacts include:

T1: Obstruction of road traffic by construction vehicles

T2: Obstruct the movement of vehicles to surrounding businesses or residents.

T3: Damage to road and bridge infrastructure.

T4: Increase in traffic volumes

Potential impacts:

Obstruction of road traffic by construction vehicles could lead to traffic congestion and increase the risk of accidents. Construction vehicles may pose a danger in areas where there which have poor sight distances and restricted work space.

Construction vehicles used to erect the repeater site may obstruct the movement of vehicles to the base station facility or surrounding businesses or residents.

Damage to road infrastructure (construction phase).

Increase in traffic volumes in operational phase.

Mitigation

- The contractor must adhere to traffic management requirements of roads authorities.

- The contractor must put in place traffic management measures such as sign boards and flagmen to slow down vehicles and alert drivers to the presence of construction activities.
- Whenever possible, the transportation and off-loading of bulk equipment should not be conducted during peak traffic periods.
- The contractor should ensure that landowners/residents on and in the vicinity of the site are aware of construction activities.
- Traffic calming measures to be implemented.

7.8. Health and Safety Impacts (HS)

Associated impacts:

HS1: Health and safety risks to the construction personnel during construction

HS2: Fire risk to surrounding residents

HS3: Safety risks to pedestrians and other road users.

Potential impacts:

The use of heavy machinery may pose health and safety risks to the construction personnel during construction.

Increased safety risks to pedestrians and other road users as a result of disrupted traffic flow and patterns, presence of heavy vehicles and machinery on public roads, as well as open trenches and other construction area present safety hazards.

Mitigation

- The contractor should ensure that all the requirements of the Occupational Health and Safety Act are adhered to.
- The road safety requirements of authorities, including SANRAL, provincial roads departments and municipalities, must be adhered to (construction phase).
- Provide suitable emergency services are readily and conspicuously available on site (construction phase).
- Demarcated areas for cooking and preparation of food to be provided. No open fires allowed except in demarcated areas.
- Ensure all relevant staff are appropriately trained to operate construction vehicles/machinery and are provided with adequate Personal Protective Equipment (PPE) (construction phase).

.