
PROPOSED HOUSING DEVELOPMENT IN
POSTMASBURG, NORTHERN CAPE PROVINCE
(DEA REF. NO: 14/12/16/3/3/1/991)
DRAFT ENVIRONMENTAL MANAGEMENT
PROGRAMME (EMPr)

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Prepared for:

Transnet SOC Limited

P.O Box 72501

Parkview

Johannesburg

2122

Prepared by:

Savannah Environmental Pty Ltd

UNIT 10, BUILDING 2,
5 WOODLANDS DRIVE OFFICE PARK
CNR WOODLANDS DRIVE &
WESTERN SERVICE ROAD,
WOODMEAD, GAUTENG
P.O. BOX 148, SUNNINGHILL, 2157
TELEPHONE : +27 (0)11 656 3237
FACSIMILE : +27 (0)86 684 0547
EMAIL : INFO@SAVANNAHSA.COM



PROJECT DETAILS

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Title	:	Environmental Assessment Process Draft Environmental Management Programme: Proposed Housing Development In Postmasburg, Northern Cape Province
Authors	:	Savannah Environmental Ravisha Ajodhapersadh Jo-Anne Thomas
Sub-consultants	:	Dave Kellock of Aurecon Morne De Jager of Enviro-Acoustic Research Tony Barbour of Tony Barbour Consulting
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DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of

individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

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

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental assessment practitioner: An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management plan/programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological

characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010;pg 185).

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: Any substance, whether or not that substance can be reduced re-used, recycled and recovered; that is surplus, unwanted, rejected, discarded, abandoned or disposed of which the generator has no further use for the purposes of production. Any product which must be treated and disposed of, that is identified as waste by the minister of Environmental affairs (by notice in the Gazette) and includes waste generated by the mining, medical or other sectors, but: A by-product is not considered waste, and portion of waste, once re-used, recycled and recovered, ceases to be waste (Van der Linde and Feris, 2010; pg 186).

ABBREVIATIONS AND ACRONYMS

DEA	National Department of Environmental Affairs
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Officer
km ²	Square kilometres
m ²	Square meters
NEMA	National Environmental Management Act (Act No 107 of 1998)
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
Transnet	Transnet SOC Limited

PROJECT DETAILS

CHAPTER 1

Due to the need for accommodation of staff in the Northern Cape, Transnet SOC Limited ("Transnet") is proposing a housing development in Postmasburg. The site identified for the housing development is situated on Transnet-owned land, which is located on the outskirts of the town of Postmasburg. The site falls within the Tsantsabane Local Municipality and greater Siyanda District Municipality (now referred to as the ZF Mgcawu District Municipality) in the Northern Cape Province. Environmental authorisation is required for the proposed housing development from the National Department of Environmental Affairs (DEA), in terms of the National Environmental Management Act (NEMA), Act 107 of 1998 and EIA Regulations of June 2010, as amended. This application was supported by a Basic Assessment process. Savannah Environmental was appointed by Transnet to undertake the required Basic Assessment process.

1.1. The Need and Desirability for the Project

The goal of the housing development project is to provide adequate housing to Transnet employees near the train station in Postmasburg. In addition, an expansion in infrastructure and rolling stock (locomotives and wagons) requires additional staff, who will also require housing facilities. The need for accommodation of Transnet staff in Postmasburg is linked to the appropriateness of the town of Postmasburg as a location in relation to planned upgrades of Transnet's rail network. Postmasburg is centrally located between two of Transnet's main rail corridors namely: The Iron Ore Line (Sishen - Saldanha) and Manganese Line (Hotazel – Port Elizabeth and Ngqura), which means that staff housed at the proposed development site will quite easily be able to service both corridors. Both iron ore and manganese are vital commodities and contribute substantially to the South African economy. Therefore the housing development project in the Postmasburg area is considered to be technically and socially desirable by Transnet.

1.2. Location of the Proposed Housing Development

The proposed residential development will be constructed in the town of Postmasburg in the Northern Cape Province of South Africa. The site falls within Ward 6 of the Tsantsabane Local Municipality. The residential development will be situated to the south of the Postmasburg train station. The site is bounded on the north and west by the train station and on the east by existing roads, namely 1st and 4th Avenue respectively. The site for Transnet's proposed housing development is planned on the following plots of land in Postmasburg (Refer to the Locality Map in Figure 1):

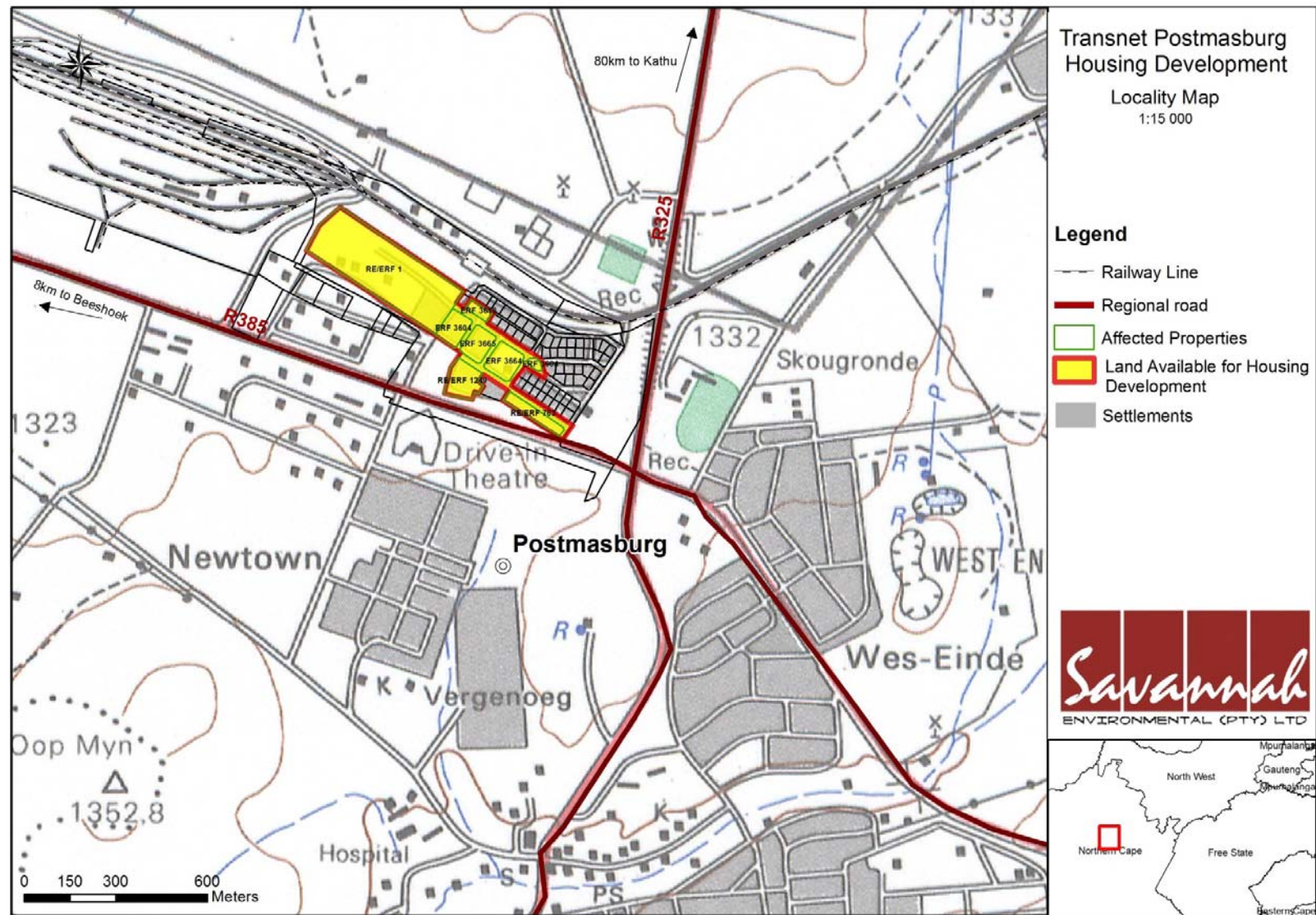


Figure 1: Locality Map showing the Proposed Site for Transnet's Housing Development Project in Postmasburg, Northern Cape Province

- » Portion of the Remainder of ERF 1
- » Remainder of ERF 3604
- » ERF 3666 (Portion of ERF 3604)
- » Erf 3618 (Portion of ERF 3604)
- » ERF 3665 (Portion of ERF 3604)
- » Remainder of ERF 1249 (Portion of ERF 1),
- » ERF 3664 (Portion of ERF 3604)
- » Remainder of ERF 763 (Portion of ERF 1)

1.3. Associated Infrastructure

A realistic estimate of 185 housing units could be accommodated on the land available to Transnet. The footprint for the housing development is up to 16 hectares in extent. Infrastructure typically associated with such a development includes, inter-alia:

- » Up to 185 housing units (two and three bedroom units);
- » New access roads (internal and each house) and upgrade of existing access roads;
- » Carports;
- » Fencing;
- » Elevated water tanks;
- » A water tower and pump station;
- » Electrical infrastructure and cabling;
- » Water Supply pipes;
- » Storm Water Pipes; and
- » Sewerage reticulation system (sewage pipes).

A recreational facility (the details of which are currently being determined) will also be developed. A typical design showing the type of houses that are being proposed for the housing development is shown in Figure 2. Each ERF will be fenced-off for security purposes.

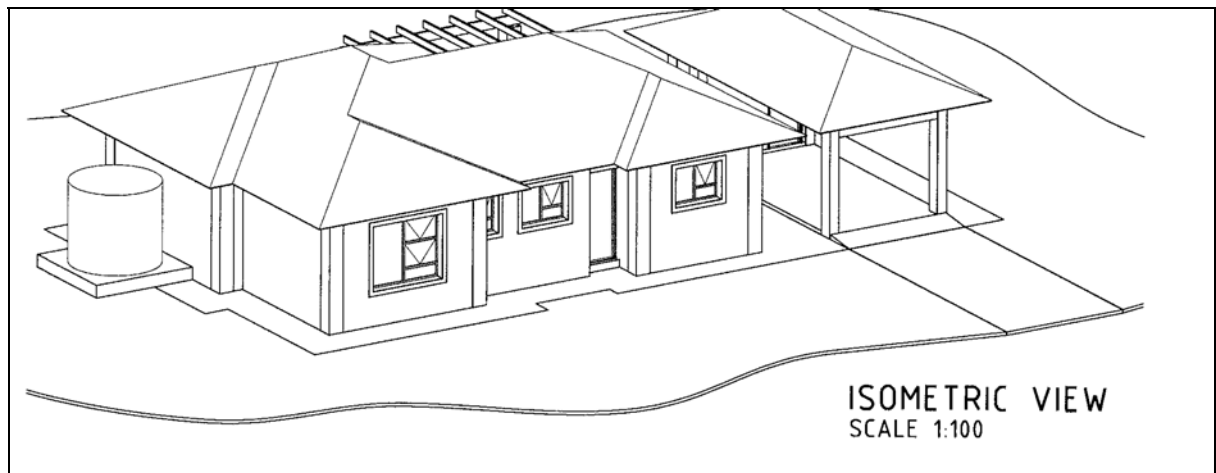


Figure 2: Typical design showing the type of houses that are being proposed by Transnet

1.4. Description of the Housing Development Project:

The detailed description of the housing development project is provided in Table 1 below and has been sourced from the Preliminary design work and reports undertaken by Hatch Goba.

Table 1: Details of the Design Criteria for the Houses And Associated Infrastructure (sourced from design reports by Hatch Goba (2013)¹

Infrastructure	Dimensions/ Details/ Specifications
Up to 185 housing units	<ul style="list-style-type: none"> » Normal foundations in accordance with those deemed-to-satisfy rules of SANS 10400 have been allowed at this stage. » Two and three bedroom units to be constructed. » A layout plan and detailed designs are attached to Appendix A. » House stand sizes between 350 m² and 450 m². » Floor area per house between 100 m² to 135 m². » Clay bricks will be used. » Foundation walls to comprise of face brick wall, insulated cavity and internal wall of an approved stock brick. » The external skin will be face brick. » Ordinary Portland cement (SABS 471) to be used. Other types of cement may only be used with permission of the manufacturer of the masonry unit. » Ready-mixed mortar may be used. » Waterproofing of houses will be undertaken. » Cement tile roofs. » Outside area to include some concrete paved areas. » Fire hose reels and fire extinguishers will be installed. » Mesh fence complete with wire
New access roads (to the development and internal roads to each house) and upgrade of existing access roads.	<ul style="list-style-type: none"> » Design of the Internal Access Roads is included in Appendix A. » ~14 internal access roads between clusters of houses are required. » Internal Access road surface will be 80 mm or 60 mm concrete interlocking block paving. » Internal access roads will have 2 lanes and will be up to 7.4m wide. » Road signs will be included. If required, special consideration is to be given to speed limit signs, intersections, pedestrian crossings and taxi and bus stops. » Two main entrances into the housing development is proposed and the existing roads which will be upgraded include: <ul style="list-style-type: none"> o Stasie Street/R385 intersection

¹ Hatch Goba, TFR Postmasburg Housing Study, Architectural and Structural Technical Specifications (April 2013)

Hatch Goba, TFR Postmasburg Housing Study, Civil Infrastructure and Design Criteria (May 2013)

Hatch Goba, TFR Postmasburg Housing Study, Electrical Design Basis & Criteria (June 2013)

	<ul style="list-style-type: none"> o 8th Avenue/R385 intersection
Carports	Each house will have a car port for parking vehicle/s.
Fencing	<ul style="list-style-type: none"> » Perimeter fencing will be a 1.8 m high diamond mesh fence. » Fencing around the stands and the playing field will be 1.2 m high diamond mesh fence.
A water tower and pump station	<ul style="list-style-type: none"> » Water pressure in the Postmasburg area is relatively low and therefore an elevated water tank will be installed to increase the water pressure. » An elevated steel sectional Braithwaite water tank will be constructed in the open space outside the entrance to the west of Postmasburg Station. The reservoir will have a footprint of 9m x 9m and will be 4m in height. The tank will be installed on a steel frame to elevate the tank 10 m above the ground level. The tank will have storage capacity of 500 kilolitres and incorporate 1.5 days storage which will supply the housing development only. » A booster pump will be installed on the new water supply pipeline to pump the water into the elevated reservoir. » A new potable water reticulation network will be installed to service the 185 new houses within the development. » The total water storage capacity required = 633 000 litres. » The following assumptions were made to determine the volume of potable water required for the development: <ul style="list-style-type: none"> o 250 dwellings @ 750 litres/day = 187500 litres/day o Total daily requirement = 201 000 litres o 72 hours storage = 3.0 x 201000 = 603000 litres o A further 30000 litres of water storage is required for fire fighting. Based on low-risk group 2 classification, whereby 500 litres/min for 1 hour is required and only one hydrant will be used at any one time to fight a fire.
Electrical infrastructure and cabling	<ul style="list-style-type: none"> » Bulk power supply will be sourced from the Tsantsabane Local Municipality (TLM). » The battery limit between the project and TLM will be at the TLM supplied medium voltage circuit breaker terminals (11 kV). » Electrical infrastructure includes: <ul style="list-style-type: none"> o An electrical supply point at each house o Street lighting

	<ul style="list-style-type: none"> ○ An electrical supply points. ○ 11 kV overhead lines. <p>» Street lighting will be in accordance with SANS 10389-1:2003 vehicle driveways – light traffic = 5 lux.</p>
Water Supply pipes and infrastructure	<p>» No existing water reticulation was identified and the lack of existing reticulation information is considered to be a design constraint.</p> <p>» Copper water supply pipes to be installed.</p> <p>» Pipe diameter - 75 mm OD (minimum) internally, 250 mm diameter main supply from existing municipal pipeline.</p> <p>» Prepaid water meters to be installed to each unit according to local authority's specifications.</p> <p>» Potable water will be supplied via a uPVC water line connected to the existing water supply on the south eastern side of the development. The existing pipe diameter is unknown and it is assumed that the new supply pipeline will be a 250 diameter pipe.</p>
Storm Water Pipes	<p>» The stormwater runoff in the area is sheet flow and there are no formal drains to divert runoff water.</p> <p>» All stormwater from the Postmasburg Station and the proposed development area drains towards a low lying area south of the development.</p> <p>» Stormwater runoff in the railway station will be collected in earth drains on the eastern side of the development and diverted around the site into existing drainage paths.</p> <p>» Stormwater within the development will be channelled into the roads. The roads will be designed to ensure that all stormwater is contained and discharged into earth v-drains on the western side of the development. The v-drains' depth and width will vary according to the volume and velocity of the stormwater. The drain will discharge into existing drains or daylight into open areas.</p> <p>» There are no significant drainage paths within the area and all runoff is sheet flow.</p> <p>» No stormwater pipes were identified on site, but it has been assumed that there are culverts crossing the existing road at the intersection to the south of the site.</p>
Sewerage reticulation system (sewage Pipes).	<p>» Minimum pipe internal diameter 100 mm.</p> <p>» Main sewer pipe 110 mm uPVC pipe, laid with fall to direction as determined on</p>

site or as noted on technical drawings.

- » Pipes to be buried a minimum of 450 mm underneath natural ground level.
- » The minimum internal diameters of the manhole chambers to be 1000 mm.
- » The current sewerage system will have the capacity to process the sewage inflow from the new development. A daily inflow of 3.5 litre/sec from the development has been calculated.

1.5. Project Life Cycle

The development of the housing units are described according to its life-cycle i.e.:

- » Planning Phase
- » Construction Phase:
- » Operation Phase
- » Decommissioning Phase (not applicable at this stage)

» **Planning Phase:**

Prior to development of the residential units in Postmasburg, Transnet is currently in process of obtaining the following approvals/ permits/ documents necessary for the project:

- Engineering Design
- Environmental Authorisation
- Re-zoning of the Land (from "transportation" to "residential") and Approval of the building plans by the Local Municipality
- Way leaves will be obtained before constructing near or over any existing services.

» **Construction Phase:**

Construction of the housing development is expected to take place over a 16 month period and will include the following:

- Development of a temporary Contractors Camp & Laydown area (1 hectare in extent)
- Earthworks:

Earthworks will include clearing of vegetation, levelling of surfaces, excavation for the drains, road box cuts, terrace and the levelling of the playing fields and the fill to the north western corner of the development site. Excavated material to be properly stockpiled and re-used where necessary. / disposed of at a suitable disposal facility as per standard Transnet waste management practices. Imported material is to be sourced from the existing borrow pit (on condition that the borrow pit has the necessary approvals in place) located approximately 3 km west of the town of Postmasburg. From the generally flat nature of the site it is anticipated that cuts and fills will be low, i.e. of the order 1-2 metres.

- Terracing:

Terracing will be required for the north-western area of the development. Terracing will require fill material to raise the localised low spot and slope the entire area towards the proposed road for drainage purposes. Topsoil removal up to 150 mm below natural ground level is to be removed to a topsoil stockpile. In-situ material is to be compacted. Fill material is to be placed in 150 mm thick layers and compacted to final terrace level. Topsoil to be replaced and evenly spread across the terrace

- Trenching and backfilling:
Trenches will be excavated to a depth to achieve at least 600 mm of cover to soffit of the pipe. Minimum depth for small diameter pipes to be 1000 mm and minimum width of trench to be 750 mm. Trenches to be backfilled with bedding sand before pipes are placed in trenches.
 - Landscaping:
Landscaping will be required on the sidewalks after service trenches have been backfilled.
 - Site Rehabilitation:
All construction work areas will be re-instated and construction waste and equipment removed, prior to hand-over to Transnet. The area will be rehabilitated/vegetated.
- » **Operation Phase:**
The housing units are planned to be ready for occupation in 2017. During the operational phase, the houses will be maintained by the Transnet employees / home owners. Limited activities will include waste management and maintenance of buildings as and when required. Refuse bins will be placed in the designated areas for collection by the Local Municipality.
- » **Decommissioning Phase:**
The housing development is not intended to be decommissioned. This lifespan can extend indefinitely to service Transnet employees.

1.6. Findings of the Basic Assessment Process

The proposed housing development is not located in an environmentally sensitive area from a biophysical and socio-economic perspective as the development is proposed in a disturbed and transformed environment. The site for the proposed housing development is located in an urban area within the town of Postmasburg. The site is not in a pristine state and currently vacant land, with bare, exposed soils in most areas and scattered alien vegetation.

The following conclusions were made in the environmental assessment report:

- » Ecology
The proposed development will be undertaken within a disturbed environment. The site is flat and there are no drainage lines or other aquatic features present on or within 500m of the site. No flora or fauna species of conservation concern occur on the site. No wildlife or game occur on the site. Due to the resultant lack of biodiversity and sensitive habitats, few animals are expected to be found in the area to be developed. Overall, the site is not considered highly sensitive in terms of flora, fauna and biodiversity. The impact on the biophysical environmental will be low.

» Soils

The ground cover on the site comprises of bare soils due to the area being historically used for houses in some parts (with old foundations present in some areas). This makes the site susceptible to erosion by wind or water. The development footprint will be cleared of vegetation, which can result in bare areas which can trigger soil erosion and soil loss. Soil contamination may also occur. With the implementation of soil erosion management measures, the construction and operation of the houses and associated infrastructure is likely to have a medium impact on soils.

» Socio-economic

- Negative social nuisances or impacts can be expected (such as noise, dust, disturbances and traffic during construction activities). These nuisances require appropriate management. These impacts are rated as having a low significance.
- Positive social and economic impacts can materialise during the construction and operational phases, specifically relating to the provision of appropriate housing and job creation. This impact is rated as being of medium-high significance.

» The following impacts are unlikely to occur as a result of the project:

- Impacts on heritage resources/ sites including graves and fossils.
- Impacts on topography.
- Impacts on underlying geology

The implementation of adequate mitigation measures (as contained in this Draft EMPr) has the potential to reduce all potential negative environmental and social impacts to a low significance. Mitigation measures to ameliorate these impacts during the construction, operational and decommissioning phases are prescribed in detail in this Draft EMPr.

PURPOSE AND OBJECTIVES OF THE EMPr

CHAPTER 2

An Environmental Management Programme (EMPr) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced.”² The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the development phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust), during site rehabilitation (i.e. soil stabilisation, re-vegetation), during operation and during decommissioning (i.e. similar to construction phase activities).

This EMPr has been compiled in accordance with Section 33 of the EIA Regulations and can be updated and further developed in terms of specific requirements listed in any environmental authorisations/ permits issued for the proposed project. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMPr has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the housing development.

² Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*. 2005

- » Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

The management and mitigation measures identified within the Environmental Basic Assessment (BA) process are systematically addressed in this EMPr, and ensure the minimisation of adverse environmental impacts to an acceptable level.

Transnet must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr and through its integration into the contract documentation. Since this EMPr is part of the EIA process, it is important that this document be read in conjunction with the Basic Assessment Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project.

PROJECT TEAM & STRUCTURE OF THIS EMPr

CHAPTER 3

The first two chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

- » Key legislation applicable to the development;
- » Planning and design activities;
- » Construction activities;
- » Operation activities;
- » Decommissioning activities;
- » Specific Management Plans including:
 - * Waste Management Plan
 - * Erosion Management Plan
 - * Alien Invasive Species Management Plan
 - * Open Space Management Plan
 - * Traffic Management Plan
 - * Re-Vegetation Plan

These chapters set out the procedures necessary for the construction of the proposed housing development to minimise environmental impacts and achieve environmental compliance. The EMPr has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators.

The following tables and specific plans form the core of this EMPr and apply to the planning, construction, operational and decommissioning (if required) phases of the housing development. These tables can be used as a checklist for the development of the project, to audit compliance with environmental requirements and environmental performance of the project. Compliance with this EMPr must be audited regularly during the construction phase and once immediately following completion of construction. This must be followed up with annual audits during the operational phase of the housing development, in line with the requirements from DEA.

3.1. Project Team

This draft EMPr was compiled by Ravisha Ajodhapersadh and Jo-Anne Thomas.

- » Jo-Anne Thomas, the principal EAP for the project, is a registered Professional Natural Scientist (in the practice of environmental science) with the South African Council for Natural Scientific Professions. She has gained extensive

knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past fourteen (14) years. She has successfully managed and undertaken EIA processes for various infrastructure projects throughout South Africa. She was supported by Ravisha Ajodhapersadh, Sheila Muniongo and Gabriele Wood from Savannah Environmental.

- » Ravisha Ajodhapersadh – (the main author of this report) holds an Honours Bachelor of Science degree in Environmental Management and has 6 years' experience in environmental management and EIAs. She is currently involved in conducting EIAs for renewable energy and other projects across the country.
- » In order to adequately identify and assess potential environmental impacts and develop the EMP, specialist studies and input was obtained by undertaking the following studies:
 - o A noise study by Acoustic Specialist Morné De Jager
 - o A traffic impact assessment by Traffic Engineer Dave Kellock.
 - o A social impact assessment by Tony Barbour.

The Savannah Environmental team have extensive knowledge and experience in EIAs and environmental management, having been involved in EIA processes over the past fourteen years. They have managed and drafted EMPs for various infrastructure projects throughout South Africa.

3.2. Roles and Responsibilities for the Planning, Construction & Decommissioning Phase of the Project and EMP

As the Proponent, Transnet must ensure that the housing development complies with the requirements of any and all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMP through its integration into the contract documentation. Transnet will retain various key roles and responsibilities during the construction of the houses. These are outlined below. Formal responsibilities are necessary to ensure that key procedures are executed.

3.2.1. Roles and Responsibilities for the Construction Phase of the Project

Figure 3 provides an organogram indicating the organisational structure for the implementation of the EMP during the construction phase of the project.

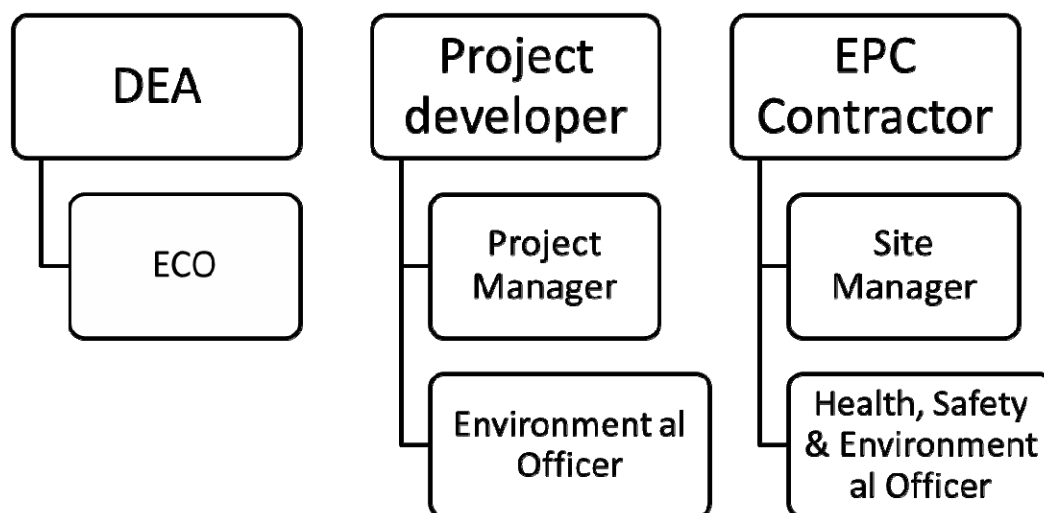


Figure 3: Organisational structure for the implementation of the EMPr during construction

Specific responsibilities of the Project Manager; Construction Manager; Safety, Health and Environment Representative; Environmental Control Officer and Contractor for the construction phase of this project are as detailed below.

The **Project Manager** will:

- » Ensure of all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that the housing development project and its Contractor(s) are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be familiar with the contents of all relevant licences and permits.
- » Be familiar with the Environmental Impact Assessment for the project, the EMPr, the conditions of the Environmental Authorisation (if issued), and all relevant environmental legislation.

The **Construction Manager** (Transnet's On-site Representative) will:

- » Be aware of the contents of the Environmental Basic Assessment Report.
- » Be familiar with the contents and conditions of the Environmental Authorisation.
- » Be knowledgeable with the contents of the Environmental Management Programme.
- » Be knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.

- » Have overall responsibility of the EMPr and its implementation on site.
- » Ensure there is communication with the Project Manager, the Environmental Control Officer and relevant discipline Engineers on matters concerning the environment.
- » Be knowledgeable with the contents of all relevant licences and permits.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.

The **Transnet Environmental Officer** will:

- » Conduct audits to ensure compliance to the EMPr.
- » Liaise with the Environmental Control Officer (ECO) regarding monitoring and reporting on the environmental performance of the construction phase.
- » Conduct internal environmental audits and co-ordinate external environmental audits.

If and as required by DEA, an independent **Environmental Control Officer (ECO)** to be appointed by the project proponent prior to the commencement of any authorised activities. The ECO will be responsible for regularly monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. The ECO must be appointed from the onset of construction until completion of physical rehabilitation. Monitoring of rehabilitation success should be the responsibility of Transnet during the operational phase. Accordingly, the ECO will:

- » Be fully knowledgeable with the contents with the Environmental Basic Assessment Report.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents with the Environmental Management Programme.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Be fully knowledgeable with the contents with all relevant environmental legislation that apply to the construction phase, and ensure compliance with them.
- » Ensure that the contents of this document are communicated to the Contractor's site staff and that the Construction Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to

address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).

- » Implement monitoring and verification to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Construction Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any deliberate contravention of the specifications of the EMPr.
- » Keep record of activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Ensure that the compilation of progress reports for submission to the Project Manager, with input from the Construction Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Construction Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep record of activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Liaise with the Construction Manager on environmental performance and other issues as required.

Contractors and Service Providers: All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications.
- » Ensuring that Method Statements are submitted to the Construction Manager and Transnet EO (and ECO) for approval before any work is undertaken. Any lack of adherence to this will be considered as non-compliance to the specifications of the EMPr.
- » Ensuring that any instructions issued by the Construction Manager on the advice of the ECO are adhered to.
- » Ensuring that a report is tabled at each site meeting, which will document all environmental incidents that have occurred during the period before the site meeting.
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- » Ensuring that a register of all public complaints is maintained.
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can

constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations).

Contractor's Safety, Health and Environment Representative: The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE Representative must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Construction Manager and Contractor.

The Contractor's Safety, Health and Environment Representative should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.
- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
- » Keep accurate and detailed records of all EMPr-related activities on site.
- » Identify all relevant Municipal bylaws and ensure compliance therewith on site.
- » Monitor construction activities on a daily basis with weekly reporting. Draft activity-based method statements for approval by Transnet EO, ECO and construction Manager.
- » Ensure all environmental incidents are properly recorded, keep photographic records of all incidents and contraventions on site, and revise method statements if changes arise.

3.2.2. Roles and Responsibilities for the Operational Phase of the Project

Formal responsibilities are necessary during the operational phase to ensure that key procedures are executed.

Transnet's Representative/ Manager will:

- » Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
- » Conduct annual reviews of the EMPr to evaluate its effectiveness.

- » Take appropriate action as a result of findings and recommendations in management reviews and audits.
- » Provide forums to communicate matters regarding environmental management.

- » Manage and report on the environmental performance of the project.
- » Conduct internal environmental audits and co-ordinate external environmental audits (if required).
- » Liaise with statutory bodies, if required, such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.
- » Ensure that the development conforms to the requirements of Transnet's SHEQ Policy. Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters related to the housing development.

KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT CHAPTER 4

The following legislation and guidelines have informed the scope and content of this EMPr Report:

- » National Environmental Management Act (Act No 107 of 1998).
- » EIA Regulations, published under Chapter 5 of the NEMA (GNR R545, GNR 546 in Government Gazette 33306 of 18 June 2010).
- » Guidelines published in terms of the NEMA EIA Regulations, in particular:
 - * Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010).
 - * Public Participation in the EIA Process (DEA, 2010).
 - * Integrated Environmental Management Information Series (published by DEA)
- » International guidelines, including the Equator Principles.

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the BA Report. A review of legislative requirements applicable to the proposed project is provided in Table 1.

Table 1: Relevant legislative and permitting requirements applicable to the proposed housing development

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
National Environmental Management Act (Act No 107 of 1998)	<p>The Basic Assessment Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GN R543, R544, R545 and R546 of 18 June 2010, a Basic Assessment Process is required to be undertaken for the proposed project.</p>	<p>Department of Environmental Affairs – competent authority</p> <p>Department of Environmental and Nature Conservation (DENC)- commenting authority</p>	The listed activities triggered by the proposed housing development have been identified and assessed in the Basic Assessment Process being undertaken. This Basic Assessment Report will be submitted to the competent and commenting authority in support of the application for authorisation.
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	Department of Environmental Affairs	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section has found application during the Basic Assessment Process through the consideration of potential impacts (cumulative, direct, and indirect). It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (Act No 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992)	<p>Department of Environmental Affairs</p> <p>Department of Environmental and</p>	Noise impacts are expected to be associated with the construction phase of the project and are not likely to present a significant intrusion

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
		<p>Nature Conservation (DENC)</p> <p>Local Authorities</p>	<p>to the local community. Therefore is no requirement for a noise permit in terms of the legislation.</p> <p>On-site activities should be limited to 6:00am - 6:00pm, Monday – Saturday (excluding public holidays).</p> <p>Should activities need to be undertaken outside of these times, the surrounding communities will need to be notified and appropriate approval will be obtained from DEA and the Local Municipality.</p>
National Water Act (Act No 36 of 1998)	Water uses under S21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required). Consumptive water uses may include the taking of water from a water resource - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water course - Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i.	<p>Department of Water Affairs</p> <p>Provincial Department of Water Affairs</p>	<p>» A water use license (WUL) is required to be obtained if wetlands or drainage lines are impacted on, or if infrastructure lies within 500m of such features. Note that there are no water resources within 500m of the site.</p> <p>» Should water be abstracted from ground water/ a borehole on site for use within the development, a water use license may be required. Note that water is</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			intended to be sourced from the Local Municipality.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	Where a mineral in question is to be mined a mining permit or mining right may be required (e.g. materials from a borrow pit) in accordance with the provisions of the Act. Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.	Department of Mineral Resources	As no borrow pits are expected to be required for the construction of the housing development, no mining permit or right is required to be obtained.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Measures in respect of dust control (S32) – no regulations promulgated yet. Measures to control noise (S34) - no regulations promulgated yet, however there are draft standards published for public comment.	Department of Environmental Affairs	No permitting or licensing requirements arise from this legislation. The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.
National Heritage Resources Act (Act No 25 of 1999)	<ul style="list-style-type: none"> » Stipulates assessment criteria and categories of heritage resources according to their significance (S7). » Provides for the protection of all archaeological and paleontological sites, and meteorites (S35). » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36). » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation 	South African Heritage Resources Agency and Ngwao Bošwa ya Kapa Bokone (the Northern Cape Heritage Authority)	It is unlikely that any significant impacts on heritage resources will result from the construction of the proposed housing development as the area has already been highly impacted. SAHRA Archaeology, Palaeontology & Meteorites (APM) Unit had no objection to the proposed development on the condition that if any evidence of archaeological sites or remains (e.g.,

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	of archaeological sites as part of tourism attraction (S44).		remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, fossils or other categories of heritage resources are found during development activities, SAHRA APM Unit (Katie Smuts/Colette Scheermeyer 021 462 4502) must be alerted immediately, and a professional archaeologist and/or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	<ul style="list-style-type: none"> » Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically 	Department of Environmental Affairs	As the applicant will not carry out any restricted activity, as is defined in S1 of the Act, no permit is required to be obtained in this regard. The site is located in an urban area with bare soil and no natural, intact vegetation. No listed species or species of

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations).</p> <ul style="list-style-type: none"> » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species. » Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species. 		conservation concern were found on the site.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	<ul style="list-style-type: none"> » Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048). 	Department of Agriculture	<p>This Act will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>No permit is required for these activities.</p>
National Forests Act (Act No. 84 of 1998)	According to this act, the Minister has declared a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove,	National Department of Forestry	They are no known protected trees on the site therefore no permit is required.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.		
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S12 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material.</p> <p>In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p>	Department of Agriculture, Forestry and Fisheries (DAFF)	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction and operational phase of the project.
Hazardous Substances Act (Act No 15 of 1973)	<p>This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <p>Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance Group IV: any electronic product; and Group V: any radioactive material.</p> <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>	Department of Health	It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.
Subdivision of Agricultural Land Act (Act No 70 of 1970)	Details land subdivision requirements and procedures. Applies for subdivision of all agricultural land in the province	Department of Agriculture	No subdivision of agricultural land proposed as the site is not located on agricultural

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			land.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 718), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. 	<p>National Department of Water and Environmental Affairs</p> <p>DENC</p>	<p>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard.</p> <p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, as detailed in the EMPr.</p> <p>The volumes of waste to be generated on the site during construction and operation of the facility will not require a waste license (provided these remain below the prescribed thresholds – i.e. 100m³ of general waste and 35m³ of hazardous waste).</p>
National Road Traffic Act (Act No 93 of 1996)	<ul style="list-style-type: none"> » The technical recommendations for highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and 	<ul style="list-style-type: none"> » South African National Roads Agency Limited (national roads) » Provincial Department of Transport 	<p>An abnormal load/vehicle permit may be required to transport the various components to site for construction. Route clearances and permits will be required for any vehicles</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>discussed.</p> <ul style="list-style-type: none"> » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. 		<p>carrying abnormally heavy or abnormally dimensioned loads.</p> <p>Transport vehicles exceeding the dimensional limitations (length) of 22m.</p> <p>Depending on the trailer configuration and height when loaded, some of the components may not meet specified dimensional limitations (height and width).</p>
Promotion of Access to Information Act (Act No 2 of 2000)	All requests for access to information held by state or private body are provided for in the Act under S11.	Department of Environmental Affairs	No permitting or licensing requirements.
Promotion of Administrative Justice Act (Act No 3 of 2000)	<p>In terms of S3 the government is required to act lawfully and take procedurally fair, reasonable, and rational decisions.</p> <p>Interested and affected parties have a right to be heard.</p>	Department of Environmental Affairs	No permitting or licensing requirements.
South African National Building Regulations	South Africa's National Building Regulations were originally produced as a set of functional guidelines for anybody building any type of structure.	The Department of Trade & Industry.	<p>All buildings will be single-storied load bearing building structures which will be constructed in compliance with the criteria set out in the National Building Regulations SANS 10400 and, where applicable, SANS 204.</p> <p>All buildings work will comply with South African, as well as the local Building Regulations, SABS Code of Practice, local by-laws and all SHE requirements. This is</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			including, but not limited to, SANS 10400-XA – Energy usage in buildings
Provincial Legislation			
Northern Cape Nature Conservation Act, Act No. 9 of 2009	<p>This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project:</p> <ul style="list-style-type: none"> » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species. » The Act provides lists of protected species for the Province. 	Provincial Department of Environmental Affairs	<p>A permit is required for any activities which involve species listed under Schedule 1 or 2. A permit would also be required to destroy or translocate any nationally or provincially listed species from the site. A single integrated permit, which covers all of these permitting requirements as well as meets ToPS regulations, is used.</p> <p>No provincially or national protected species occur on the site, as it located in a disturbed, urban area containing bare soil and limited vegetation.</p>
Northern Cape Planning and Development Act (Act 7 of 1998)	Provides for the overall framework and administrative structures for planning throughout the Northern Cape.	Relevant Municipality Local	A land development applicant who wishes to establish a land development area must comply with procedures set out in the Act.
Local Legislation/ Policies / Guidelines			
Siyanda District Municipality Environmental Management Framework	The Environmental Management Framework (EMF) deals with environmental concerns and conservation priorities within the municipality. According to the EMF, the town of Postmasburg has been categorised and mapped as Zone 0 (Figure 3) in the	Siyanda District Municipality (now referred to as the ZF Mgcawu District	None, guideline/ environmental management document.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	EMF Environmental Sensitivity Index, indicating the site and town of Postmasburg as a low environment sensitivity rating (as it is urban area). In terms of the Conservation Planning, the site falls outside existing/ proposed conservation areas or conservation priority areas (in terms of vegetation) within the Siyanda District Municipality (Figure 4). Therefore, based on the EMF, the proposed housing development in Postmasburg does not compromise the integrity of the existing environmental management priorities within the Siyanda District Municipality.	Municipality).	
Tsantsabane Local Municipality: Scheme Regulations Of 2009	<p>The Tsantsabane Local Municipality: Scheme Regulations Of 2009 was promulgated in terms of Sect. 36(1) of the Northern Cape Planning and Development Act (1998).</p> <p>This document provides regulations, process and requirements for land use control within the municipality. The Council`s zoning scheme consists of the following components:</p> <ul style="list-style-type: none"> a) the scheme regulations; b) the zoning map(s), c) the zoning register, and d) Procedure and requirements for applications. <p>An application for rezoning will be required for the housing development, due to change in the land-use from "transportation" to "residential".</p> <p>Restrictions apply, based on the category of residential development (Residential zone I – V). Land Uses Restrictions include for a Residential zone II re as follows:</p> <ul style="list-style-type: none"> » Density: at most 30 units per gross hectare or a 4: 1 ratio with regard to the surrounding density of residential units, whichever allows the lowest number of units, provided that a group site does not exceed 3 hectares and provided that three sites intended for group housing may not be adjacent 	Tsantsabane Local Municipality	<p>» Rezoning for the housing development to be applied for from the municipality, in line with these regulations.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>to each other. In specific cases (that is, where group housing sites were originally planned as such and open spaces and/or streets are supplied in a suitable manner and do not have to be included in the subdivision of the site) not more than 40 units per gross hectare.</p> <ul style="list-style-type: none"> » Height: at most 8m above the natural ground level directly beneath any particular point or portion of the building (also see the definition of group housing and also clause 4.16) » Building lines: the street building line may be zero, but if necessary for safe traffic movements or for other reasons like aesthetics and character of the development in the area, a street building line of 2m may be imposed. The street building line with regard to the garage is 5m, or alternatively the design should be such that any motor vehicle can be safely parked on the property, outside the street reserve when the garage door is closed. Except as may be necessary for service mains, the building line with regard to the rear boundary and side boundaries can also be zero. However, where this zone borders another zone (Open space zone excluded), a building line of 2m shall apply with regard to the rear and side boundaries. » Parking: at least 2 parking bays per group house. Both parking bays may be provided on the group erf, or a portion of the requirement for the project may be provided communally or the entire requirement may be provided in the form of communal parking, provided that at least 50% of the parking bays shall be covered. » Street widths: for a private or public street at least 10m reserve, but 8m wide in cases of a cul-de-sac which does not serve more than 14 group houses. » Communal open space: at least 80m² per residential unit. These open spaces exclude streets, private outdoor space and communal service areas. This requirement shall fall away if Council is of the opinion that sufficient open space 		

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>is available.</p> <ul style="list-style-type: none"> » Private outdoor space: at least 40% of the gross floor area of the relevant unit in a form of which the sides do not exceed a ratio of 2.5:1. » Design: the purpose reflected in the definition of group housing (as included in the definition) should be followed and implemented very closely. » Advertisement and publicity: All boards, signs and other forms of advertising and publicity must comply with Council's advertising policy. 		
Tsantsabane Local Municipality: Spatial Development Framework	The Spatial Development Framework (SDF) supports the Municipality's Vision as indicated in the IDP document and is intended to promote an urban and rural development that will spatially suitable within the municipality.	Tsantsabane Municipality Local	None, generally applicable, to guide spatial developments in the municipality.
Tsantsabane Local Municipality: Integrated Development Programme	<p>The Tsantsabane Local Municipality's IDP identifies six key performance areas (KPAs) that are line with KPAs identified by National Government. Of these the following are relevant to the proposed housing development:</p> <ul style="list-style-type: none"> » KPA 1: Service Delivery » KPA 2: Local Economic Development 	Tsantsabane Municipality Local	None; generally applicable, to guide plans, policies and programmes based on the development needs within the municipality.

Various South African National Standards have been considered in the planning and design of the project including:

- » SANS 10100: The structural use of concrete
- » SANS 10160: The general procedures and loadings to be adopted in the design of buildings
- » SANS 10161: The design of foundations for buildings
- » SANS 10163: The structural use of timber
- » SANS 10164: The structural use of masonry
- » SANS 1491: Portland cement
- » SANS 10400: The application of the national building regulations
- » SANS 204: South African National Standard – Energy efficiency in buildings
- » ISO 9001: Quality management systems: Requirements

MANAGEMENT PROGRAMME: PLANNING PHASE

CHAPTER 5

Table 2: Environmental Management Programme for Transnet's housing development in Postmasburg (Planning Phase)

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
2.1 Design Considerations	<ul style="list-style-type: none"> » Design of the housing development to consider the addition of vegetated open spaces between clusters of houses, to benefit from the habitat and ecosystem services which plants provide. » Geophysics gravity surveys recommended to be undertaken by the geotechnical engineer. » Follow up percussion drilling to be done before the dolomitic area designation can be determined in accordance with National Home Builder Registration Council (NHBRC) recommendations. » Adhere to any specifications as a result of the geotechnical report/ survey. » The traffic study recommended, from a safety standpoint, that pedestrian crossings be installed at the main R385 / R325 intersection when this intersection is upgraded to alleviate any road safety risks. Transnet to consider this recommendation. » The traffic study recommended that the streets within the housing development will need to be surfaced with sidewalks; formalised controls and road markings. This will improve internal traffic conditions. Transnet to consider this recommendation. » A stormwater management plan to control and manage water from the roads and the housing infrastructure to be compiled by the appointed contractor before the onset of construction. » 	Transnet	Design Phase
2.2 Appointment and Duties of ECO	Transnet to appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the EMP, during the construction phase, on a regular basis, based on DEA requirements contained in the Environmental Authorisation.	Transnet	Once-off appointment during the construction phase. ECO to conduct audits on a regular basis (as required by the EA)

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
	Transnet to provide the contractor and sub-contractors with a copy of the draft EMPr.	Transnet	Once-off, during the tender stage
	The ECO to form part of the project management team and attend relevant project meetings.	Transnet, Contractor	Continuous
	The contractor must ensure that the contractors and sub-contractors attend an environmental briefing and training session presented by the ECO prior to commencing construction activities on site.	Contractor, ECO	Once-off, prior to the start of construction
2.3 Environmental Awareness & Training	<ul style="list-style-type: none"> » The Contractor to ensure that all site personnel have a basic level of environmental awareness training. » The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. 	Contractor	Planning & Construction
2.4 Site Establishment	<ul style="list-style-type: none"> » Adjacent landowners to be informed in advance of construction activities commencing on-site. » The contractor must establish infrastructure (such as the construction camp, offices etc.) as per the agreed/ approved site layout plan. 	Contractor, ECO	Planning & Construction
	The contractor to submit a method statement for site clearance for approval by the Project Manager and the ECO before commencement of construction. Site establishment shall take place in an orderly manner and all required amenities to be installed at Camp site before the main workforce move onto site.	Transnet, Contractor, ECO	Planning Phase
	The Construction camp must have the necessary ablution facilities with chemical toilets at commencement of construction activities to the satisfaction of the Project Manager and ECO.	Contractor, ECO	Planning & Site Establishment
2.5 Social	Safe drinking water for human consumption to be made available at the site offices and at other convenient locations on site. All water used on site must be taken from a legal source and comply with the recognised standards for potable and other uses.	Contractor, ECO	Planning & Site Establishment
	Local contractors should be provided an opportunity to be included in a list of possible local suppliers and service providers for the construction phase of the project.	Contractor, ECO	Planning & Construction
	Before the construction phase commences the proponent and its contractors should meet with representatives from the TLM to establish the existence of a skills database for the area. If such a database exists it should be made	Transnet	Planning Phase

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
	available to the contractors appointed for the construction phase.		
		Transnet	
2.6 Communicating with stakeholders	The municipality has established a Development Forum with representatives from the larger mining companies. The forum was referred to as Tsasamba. It is recommended that Transnet liaise with the local municipality and become involved in the Tsasamba initiative.	Transnet	Construction Phase
2.7 Emergency Preparedness	If chemicals in sufficient quantity and toxicity have the potential to be released on the construction sites, emergency contingency plans should be prepared as safety measures (bunded areas). These safety measures should be communicated to the relevant personnel on the construction site. All hazardous installations require a Risk Assessment in terms of the Occupational Health and Safety Act, (Act No.85 of 1993) for construction sites.	Transnet, Contractor, ECO	Planning & Construction
2.8 Landscaping	Indigenous trees to be used within the proposed housing development.	Transnet, Contractor	Continuous

MANAGEMENT PROGRAMME: CONSTRUCTION PHASE

CHAPTER 6

Prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness to be achieved in the following ways:

6.1 Environmental Awareness Training

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO/ Transnet's Environmental Officer before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO / Transnet's Environmental Manager.

6.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should include discussing Transnet's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the ECO / Transnet's Environmental Officer.

6.3 Toolbox Talks

During construction, toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

Table 3: Environmental Management Programme for Transnet's housing development in Postmasburg (Construction Phase)

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
3.1 Site establishment	<p>If feasible, a community liaison officer must be sourced from the Stasie community.</p> <ul style="list-style-type: none"> » Ablutions and potable water to be provided to construction workers. » Chemicals such as fuel, oil, paint, and materials to be stored in secured, bermed areas or locked areas. » Construct anti-erosion berms on access roads. 	Contractor	Construction
3.2 Construction camp	<ul style="list-style-type: none"> » The construction camp must be located as per the approved site plan/ design. » The construction camp will be limited to storage and site office space; workers will not be accommodated/ housed at the camp. » No fires will be allowed on site. » If the construction camp or lay down area must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects 	Contractor	Construction
3.3 General	Appropriate building techniques must be used for the construction of the housing development by applying the SABS 0400 – 1990 code of practice of the South African National Building Regulations.	Transnet, Contractor	Continuous during Construction
	On completion of work, remove construction materials, waste and surplus from the site.	Contractor	Continuous during Construction
	Open areas which were cleared for construction must be graded and scarified to restore the ground to as near as practicable to its original profile before topsoil placement.	Contractor	Continuous during Construction
	Any employees of the Contractor or subcontractors found to be in breach of any of the requirements of the EMPr may be ordered by the ECO to leave the site forthwith. The order may be given orally or in writing. Confirmation of an oral order will be given as soon as practicable but lack of confirmation in writing shall not be a cause for the offender to remain on site.	Contractor, ECO	Continuous during Construction
	All discharge points will require approval by the ECO/ relevant party. Discharges include concrete mixing, vehicle washing etc.	Contractor, ECO	Continuous during Construction

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
	Construction equipment may not move outside the area defined as the site.	Contractor, ECO	Continuous during Construction
3.4 Erosion, sedimentation and flooding	Stormwater on site must be managed as per the storm water management plan.	Contractor	Continuous during Construction
3.5 Erosion & Storm Water management	<ul style="list-style-type: none"> » Implement measures to effectively contain and allow settling prior to its discharge of any stormwater arising at the construction site. » Appropriate erosion control structures such as earth embankments / erosion mats must be utilised where soil may be exposed to erosion risks. » Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion. » All bare areas should be suitably top soiled and vegetated as soon as is possible after construction is completed in an area. » Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. 	Contractor, ECO	Continuous during Construction
3.6 Handling of Chemicals	<ul style="list-style-type: none"> » Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. » Chemicals to be stored in bunded and well-ventilated areas. » Storage of potentially hazardous substances should be above any 100-year flood line, or as agreed with the ECO. These materials include fuel, oil, cement, bitumen etc. » Sufficient care must be taken when handling hazardous substances to prevent pollution. » If deemed necessary by the ECO, surface water draining off contaminated areas containing oil and petrol to be channelled towards a sump which will separate these chemicals and oils. » Oil residue to be treated with oil absorbent such as Drizit or similar and this material removed and taken to an approved waste site. » All hazardous construction materials / chemicals to be stored in appropriate structures with impermeable flooring. » Portable toilets are to be provided for 	Contractor, ECO	Continuous during Construction

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
	<p>construction crews. Maintenance must include regular removal of waste without sewage spillage.</p> <p>» Under no circumstances may ablutions occur outside of the development footprint.</p>		
3.7 Cement / Concrete Batching	<p>» Any spillage, which may occur, will be investigated and immediate remedial action shall be taken.</p> <p>» Concrete is to be mixed on an impervious surface/ material, not directly on the soil.</p> <p>» All concrete and tar that is spilled outside the development footprint to be promptly removed by the Contractor and taken to an approved waste site.</p> <p>» After concrete / tar mixing is complete, all waste concrete / tar to be removed from batching area/s and disposed of at an approved disposal site.</p>	Contractor, ECO	Continuous during Construction
3.8 Use of Pesticides/ Herbicides	<p>» The application of biocides should be avoided during heavy rainfall and under windy conditions.</p> <p>» Where pesticides are used, only those that do not contain diazinon or malathion should be used.</p>	Contractor, ECO	Continuous during Construction
3.9 Erosion Control	» Refer to Erosion Management Plan (Chapter 10).	Contractor, ECO	Continuous during Construction & Post-Construction
		Contractor	As and when required
3.10 Landscaping	<p>» Landscaping within the development footprint must be done using indigenous vegetation</p> <p>» Backfill may require contouring to ensure that it blends in with the surrounding environment.</p> <p>» Remediated slopes should be graded to a suitable level.</p> <p>» Slopes can be capped with topsoil. This requires a minimum layer of 100 mm.</p> <p>» Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with overburden and topsoiled.</p>	Contractor	As necessary
3.11 Management of Topsoil	Topsoil to be stripped before excavation or construction commences, from all areas that are to be utilized during the construction period and where permanent structures and access is required. Topsoil	Contractor	Pre-Construction, prior to bulk earthworks

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
	shall be deemed to be the top layer of soil containing organic material, nutrients and plant and grass seed. Topsoil removed for vegetation clearance must be stripped to a minimum depth of 150 mm.		
3.12 Destruction of Vegetation	All invader plant species must be removed from the site, including blue gum trees and <i>prosopis spp.</i> trees.	Contractor	Construction
	Collection of firewood from neighbouring properties by construction staff is strictly prohibited.	Contractor	Construction
	Burning of fires is prohibited on the construction site.	Contractor	Construction
3.13 Impact on Animals	No wildlife may be introduced into the area without obtaining the necessary permits.	Contractor	Construction
	Should the contractor encounter any plant or animal species which they are uncertain or concerned about, an environmental specialist to be consulted in this regard.	Contractor	Construction
	All construction vehicles should adhere to a low speed limit to prevent collisions with any animal species.	Contractor	Construction
3.14 Domestic Animals	Speed limit on the construction site should be maintained at 40km/hr to avoid injury to or mortality of domestic animals.	Contractor	Construction
3.15 Destruction of heritage resources	If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, fossils or other categories of heritage resources are found during development activities, SAHRA APM Unit (Katie Smuts/Colette Scheermeyer 021 462 4502) must be alerted immediately, and a professional archaeologist and/or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.	Contractor	Construction
	If concentrations of archaeological materials are exposed then all work must stop in the affected area for an archaeologist to investigate. A systematic and professional investigation must be undertaken. Sufficient time should be allowed to investigate and to remove or collect such material. Specific recommendations will	Contractor	As necessary

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
	follow from the investigation.		
	If any human remains or any other concentrations of archaeological heritage material are exposed during construction, all work must cease in the affected area and it must be reported immediately to the nearest museum/archaeologist or the Northern Cape Heritage Authority and the South African Police Services (for human remains).	Contractor	Continuous
3.16 Crime, safety and security	A temporary security fence around the development site must be erected before construction commences.	Contractor	Once-off
	Inspect the security fence on a regular basis to check that no illegal entry points are created.	Contractor	Daily
	Any illegal occupants must be removed from the site to ensure no uncontrolled fires, cutting down of vegetation and littering.	Contractor	As required
	The site and construction crew are to be managed accordance with the Occupational Health and Safety Act, 1993 (Act No.85 of 1993) and the National Building Regulations.	Contractor	Daily
	The contact details of the police or security company and ambulance services must be available at an appropriate location on the site.	Contractor	Continual
	Access to the construction site to be controlled.	Contractor	Daily
	Appropriate notification signs must be erected, warning the residents and visitors about the hazards around the construction site and presence of heavy vehicles. Post notices at key points such as the entrance gates /boundaries.	Contractor	Construction
3.17 Noise pollution	The development must comply with the local by-laws regarding noise.	Contractor	Construction
	A written warning of two (2) days indicating the approximate time of blasting (if any) must be given to affected residents.		As and when required
	Maintain machinery in good working order.	Contractor	Construction
	<ul style="list-style-type: none"> » Construction working hours should be confined to between 06h00 and 18h00. » Construction activities over weekends should only be permitted between 08h00 and 13h00 on Saturdays. » No construction related activities should be permitted on Sundays and Public Holidays. 	Transnet, Contractor	Construction

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
3.18 Atmospheric pollution / Odours and Dust	Apply dust control measures, such as spraying water on surfaces or use of products such as dustex, during the construction phase and under windy conditions or when dust problems arise.	Contractor	As necessary
	Burning of waste is prohibited.	Contractor	Daily
	All vehicles transporting material that can be blown off (e.g. soil, rubble etc.) must be covered with tarpaulins and local speed limits must be adhered to.	Contractor	Spot checks: daily-weekly, as necessary
	Vehicles to be used during the construction phase are to be kept in good working condition so as not to be the source of excessive fumes and nuisance.	Contractor	Daily
	Burning of cleared vegetation and wastes/refuse is prohibited.	Contractor	Daily
3.19 Visual impact	Waste, building rubble and litter must be removed on a weekly basis and be disposed of at a suitably registered landfill.	Contractor	Weekly
	The buildings that are to be erected should be aesthetically pleasing and blend into the area as far as possible.	Transnet, Contractor	Once-off
	Landscaping must enhance the aesthetic appeal of the development.	Transnet, Contractor	Once-off
	Indigenous vegetation to be used to create habitats that attract the natural fauna in the area, as far as possible.	Contractor, Landscape contractor	As necessary
	Advertising on site must be in accordance with South African Manual for Outdoor Advertising Control (SAMOAC).	Transnet	Continuous
3.20 Waste	Refer to Waste Management Plan (Chapter 9).	Contractor	Continuous
3.21 Social & Community Issues	<ul style="list-style-type: none"> » Ensure safe and secure public transport access points. » Display of danger warning signs at safety risk areas. » Prevent public access to any excavations. » The movement of construction workers should be contained within the construction site during working hours, to avoid any potential for impact in proximate residential areas. » Continue any current HIV/AIDS awareness and support programmes to the construction work-force for this development. 	Contractor	Continuous
3.22 Monitoring system to detect any leakage or spillage of all hazardous substances during	Fuel storage areas should be inspected regularly to ensure bund stability, integrity and function.	Contractor	Construction
	Construction machinery should be stored in an appropriately sealed area.	Contractor	Construction

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
their transportation, handling, use and storage	Spilled cement will be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Construction
	Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Construction
	In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Construction
	Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Construction
	Upon the completion of construction, the area will be cleared of potentially polluting materials.	Contractor	Completion of construction
	Areas required to be cleared during construction will be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor	Pre-construction

MANAGEMENT PROGRAMME: OPERATIONAL PHASE

CHAPTER 7

During the operational phase, responsibility for environmental management of the houses and associated infrastructure are as follows:

- » Transnet will be responsible for the houses, while the occupants (Transnet employees) will be responsible for maintenance of the houses.
- » The local municipality will be responsible for waste collection and disposal, as well as maintenance of infrastructure such as the water pipes, storm water pipes, roads and in line with the services agreement with Transnet.
- » The recreational facility and associated open spaces (communal spaces) will be managed by Transnet.

The following principles for environmental management will apply to the recreational facility and associated open spaces:

- » Maintain plant cover (indigenous tree and shrub species) in communal and open spaces. Prune trees and allow pruning's/ leaf litter to be spread onto the ground for nutrient exchange.
- » Communal litter bins to be placed at strategic points within the recreational facility during the operational phase.
- » All buildings and landscaped areas must be appropriately maintained.
- » All alien vegetation to be removed on a regular basis. Any landscaping should make use of indigenous species.

MANAGEMENT PROGRAMME: DECOMMISSIONING PHASE

CHAPTER 8

The housing development is not intended to be decommissioned. The lifespan of the houses can extend indefinitely to service Transnet employees. However, should the entire development be decommissioned, this section of the EMPr will apply.

Table 5: Environmental Management Programme for Transnet's housing development in Postmasburg (Decommissioning Phase)

Activity / Issue	Mitigation: Action/control	Responsibility	Timeframe
5.1 Compliance with legislation	All relevant regulations, national and local legislation relevant to decommissioning to be adhered to and the relevant authorities are informed and involved in the process as much as possible.	Transnet	Decommissioning
5.2 Rehabilitation	Rehabilitation should start immediately after decommissioning is completed.	Transnet	Decommissioning
	Provision of money/ funds to be allocated for decommissioning of the houses and associated infrastructure.	Transnet	Decommissioning
	All excavations must be rehabilitated with soil and topsoil, which should not contain invasive plant species (in compliance with the CARA, as amended), to the satisfaction of the ECO.	Transnet	Decommissioning
	Re-vegetation specifications to be developed. Also refer to Re-Vegetation Plan for guidance.	Transnet, Contractor	Decommissioning
	All building materials must be removed from the site. All compacted surfaces must be ripped and re-vegetated as per the re-vegetation specifications.	Transnet, Contractor	Decommissioning
	The most suitable seed mix and indigenous species for disturbed areas to be used for rehabilitation.	Transnet, Contractor	Decommissioning
	Rehabilitation to be conducted in a progressive manner (i.e. once decommissioning in an area has been completed the area will be rehabilitated). The rehabilitation of the area with indigenous vegetation must coincide with the rainfall events and all alien invasive vegetation shall be removed.	Transnet, Contractor	Decommissioning
	Rehabilitation measures for the site are to include the following: » Re-contouring Subsoil stockpiles should be used to re-contour construction affected areas. The Contractor shall restore the profile, soil condition and landform to as close as possible state to the pre-construction state.	Transnet, Contractor	Decommissioning

	<ul style="list-style-type: none"> » Scarification and ripping All areas where rehabilitation interventions are required shall be cross-ripped before topsoil placement. Topsoil and fertile soil shall be uniformly scarified to allow for vegetation growth » Fertilising The Contractor shall be required to perform soil analysis tests on the top 75mm of prepared surface prior to re-vegetation/seeding to determine the required fertiliser levels for permanent cover. » Seed acquisition The Contractor shall purchase seed from a South African National Seed Organisation (SANSOR) accredited dealer. Seed used for rehabilitation shall not be older than one season. Purchased seed must be of the correct species and of known origin, dried and packed, conforming to all legal requirements for seed. Proof of compliance must be provided to Transnet prior decommissioning of works. 		
5.3 Topsoil	The Contractor shall schedule works for placing of topsoil once all infrastructure has been successfully decommissioned. Seeding can then take place after the first rains of the season and should be concluded by one month before the end of the growing season.	Contractor	Decommissioning
5.4 Alien vegetation	The Contractor shall maintain rehabilitated areas free of weeds and invader plants until the end of the Defects Notification Period applicable to rehabilitation. Control of weeds and invader plants must be done in accordance with the specifications stipulated in the CARA.	Contractor	Decommissioning
5.5 Erosion	The Contractor shall be responsible for the prevention of erosion in areas impacted upon by their activities. All erosion repairs must be implemented at the first signs thereof and no erosion shall be allowed to develop on a large scale.	Contractor	Decommissioning
5.6 Waste	<p>All recyclable rubble and solid waste (e.g. scrap metal, cables, bottles, cans, and plastic residues) shall be collected and disposed of through a registered recycling company. Waste manifests will be kept by the Contractor.</p> <p>All non-recyclable rubble and solid waste shall be collected and disposed of at an approved waste disposal site.</p>	Contractor	Decommissioning

WASTE MANAGEMENT PLAN

CHAPTER 9

1. Introduction

Waste is broadly defined by the Department of Water Affairs in 1994 as: 'an undesirable or superfluous by-product, emission, residue or remainder of any process or activity'. The Waste Management Plan (WMP) will be applicable during the Construction and Operational phases of the Proposed Housing Development in Postmasburg and will be for use by the Contractors and the sub-contractors that will be involved during the Construction phase. The purpose of this plan is to describe the identification, handling, storage, transportation and disposal of the waste, materials and products generated during construction. The objective of waste management plan is to control the generation of waste in order to avoid, reduce or control the waste generation and potential pollution to the surroundings environment.

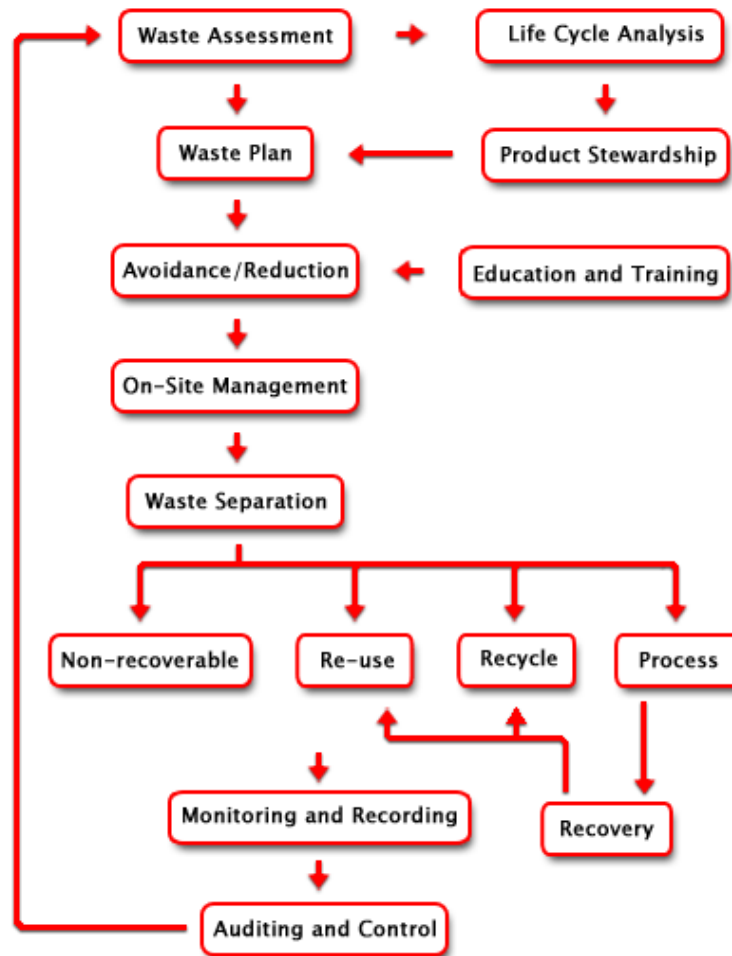
The project site will mostly contribute to the following waste:

- » Concrete / Cement
- » Waste soil/inert waste
- » Effluent from portable toilet facilities
- » Hazardous Waste
- » Building Waste

2. Approach to Waste Management

An integrated approach to waste management on site is needed. Such an approach is illustrated in the figure below.

The Integrated Waste Management Approach to Waste



Source: <http://www.enviroserv.co.za/pages/content.asp?SectionId=496>

There are three basic steps for construction waste management, i.e. Reduce, Reuse, and Recycle. **Reduce** is the prevention of the waste from arising and optimising material usage. Waste avoidance and waste reduction can be achieved through improved education and training - by improving efficiencies and by making staff environmentally aware.

Reuse is using existing materials instead of throwing these away. Reusing does not mean that it needs to be reused on the same construction site. Selling or donating waste materials to a third party is one option of construction waste management.

Recycle is somewhat limited since it only allows for those items that can be used on-site. The most important step for recycling of construction waste is on-site separation. Initially, this will take additional effort and training of construction personnel. Targets should be set for the levels of recycling. Once separation habits are established, on-site separation can be done at little or no additional cost.

3. What to Recycle

Before recycling construction waste, identify who will accept it. This is important in designating type of waste to separate, and in making arrangements for drop-off or delivery of materials. Materials that can be recycled include:

- » Cardboard and Paper
- » Wood
- » Metals
- » Plastics
- » Glass
- » Paints, Stains, Solvents and Sealants
- » Oil

4. Training

Basic awareness training regarding the WMP requirements to be provided to all employees. Specific training will be provided to employees directly involved in handling of the waste management. The awareness training to be provided to all employees and subcontractors will as a minimum, cover the following topics:

- » A presentation of the waste management plan;
- » A description of the type, nature and source of waste;
- » Handling and storage of waste;
- » Treatment and final disposal of waste; and
- » Waste minimisation opportunities.

5. Materials Separation

Successful recycling requires good clean uniform collections of single waste types. This is most effectively achieved by separating the waste streams close to source rather than at the landfill site. Containers for material recycling must be set up on site and clearly labelled. Construction personnel must be trained in material sorting policy, and bins must be monitored periodically to prevent waste mixing as a result of construction employees throwing rubbish into the bins.

Some materials will require bins or storage that protect these from rain. Other bins may be locked to prevent tampering.

6. Recycling and Waste Minimisation Guidelines

- » *Wood*
 - * Optimise building dimensions to correspond to standard wood dimensions in order to reduce the need for cutting.

- * Store wood on level blocking under cover to minimize warping, twisting and waste.
- » *Metals*
 - * During construction, separate metals for recycling, including copper piping, wire, aluminium, iron and steel, nails and fasteners, galvanized roofing. It is critical to keep lead out of landfills because it could leach into groundwater.
- » *Cardboard and Paper*
 - * Avoid excessively packaged materials and supplies. However, be sure packaging is adequate to prevent damage and waste.
 - * As far as possible, use recyclable packaging.
 - * Separate cardboard waste, bundle, and store in a dry place.
 - * Minimise the number of blueprints and reproductions necessary during the design and construction process.
- » *Plastic*
 - * Avoid excessively packaged materials and supplies. However, be sure packaging is adequate to prevent damage and waste.
 - * As far as possible, use recyclable packaging.

Since more than 60 different types of plastic resins exist, the Plastics Federation of South Africa has adopted a voluntary number coding system for each category of plastics to aid in their sorting by material type for recycling (Bruyns et al, 2002). The most common resin types are itemised in Table 6.

Table 6: Identification System for Plastic

Id Number	Plastic Resin Type
1	PET (polyethylene terephthalate)
2	HDPE (high-density polyethylene)
3	PVC (polyvinyl chloride) or V (vinyl)
4	LDPE (low-density polyethylene)
5	PP (polypropylene)
6	PS (polystyrene)
7	Other (laminates, etc.)

- » *Paints, Stains, Solvents and Sealants*
 - * Unused materials should be taken to a hazardous waste collection facility.

7. On-site Management – Waste Collection Points

Good supervision of the waste management programme on site is critical to success. Management of the entire on-site program is critical to ensure smooth operations. The main waste collection point will be located in an easily accessible area within the construction camp. The selected waste area will comprise of clearly marked waste skips. The waste area will make provision for the segregation of waste into general and hazardous waste.

8. Auditing and Control

The success of the waste plan is determined by measuring criteria such as waste volumes, cost recovery from recycling, cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan. Finally, good record keeping and control, becomes a continuous waste assessment process, allowing the waste plan to be improved and adjusted as required.

9. Specific Mitigation Measures

Table 7: Specific Mitigation Measures For Waste Management

Activity / Issue	Mitigation Measures	Responsible Party	Timeframes
7.1.General	Adequate waste bins should be provided in order to prevent littering on site.	Contractor	Construction
	Liaise with the Local Authority or the responsible company for the collection of domestic waste on weekly basis, depending on the volumes and quantities generated thereof.	Transnet	Operations
	The Contractor must ensure that there is an area that has been clearly demarcated as a temporary storage area for general, hazardous and recyclable wastes.	Contractor	Construction
	The Contractor must ensure that necessary arrangements are made beforehand for the safe disposal of hazardous waste generated on site by an accredited waste company.	Contractor	Construction
	The Contractor will also be required to make necessary arrangement for the storage and collection of recyclable waste that is generated on site.	Contractor	Construction
7.2.Site control, Demarcation, Security, Access Control	Areas, Containers and Skips identified for the storage of general, recyclables wastes shall be clearly marked to indicate the intended purposes i.e., glass only.	Contractor	Construction

Activity / Issue	Mitigation Measures	Responsible Party	Timeframes
7.3. Requirements for Waste Management and Collection Contractors	General waste shall be collected and be disposed of at a suitably registered waste site.	Contractor	Construction
	Recyclable waste shall be collected by a recognised recycling service provider for appropriate recycling purposes.	Contractor, Transnet	Construction & Operations
	Hazardous wastes to be collected for disposal at a suitably registered hazardous waste site.	Contractor	Construction
7.4. General: waste	Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at a suitably registered waste disposal site.	Contractor	Construction
	All building rubble, solid and liquid waste etc. must be disposed of as necessary at an appropriately licensed refuse facility.	Contractor	Construction
	The Contractor must ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires will be allowed on site.	Contractor	Construction
	The Contractor must ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project are disposed of at dumping site as approved by the Council.	Contractor	Construction
	The Contractor must ensure the Waste collection vehicles, when collecting waste from site, are equipped with covers to prevent waste from being blown off the waste collection vehicle during transportation	Contractor	Construction
7.5. Hazardous Substances	If potentially hazardous wastes are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/materials to be used together with the procedures for the storage, handling and disposal of the materials in a manner which will reduce the risk of pollution that may occur from day to day storage, handling, use and/or from accidental release of any hazardous substances used.	Contractor	Construction
	Hazardous chemical substances used during construction shall be disposed of appropriately.	Contractor	Construction
	The waste, resulting from the use of hazardous materials, shall be disposed of at a hazardous waste disposal site. Storage and disposal of waste is regulated through other legislation, which should be complied with i.e. the Occupational Health and Safety Act.	Contractor	Construction
7.6. Health Risks	The Contractor must ensure that all persons involved in hazardous waste collection, sorting,	Contractor	Construction

Activity / Issue	Mitigation Measures	Responsible Party	Timeframes
	transport and disposal have undergone the necessary training.		
7.7.Record Keeping	The Contractor shall keep records for the regular collection of all waste types and disposal thereof, details of waste company responsible for waste collection, etc.	Contractor	Construction
7.8.General	Waste storage areas must have adequate provision in place to prevent fires.	Contractor	As necessary
	No waste shall be retained on site for a period exceeding 14 days	Contractor	Continuous
	Containers must be emptied frequently to avoid rodents, insects or any other organisms accumulating on the site and becoming a health hazard to adjacent properties.	Construction crew	Continuous

EROSION MANAGEMENT PLAN

CHAPTER 10

1. Purpose

The Erosion Management Plan addresses the management and mitigation of significant impacts relating to soil erosion due to the proposed housing development in Postmasburg.

The objective of the plan is therefore to provide:

- » A general framework for erosion management, which enables the contractor to identify areas where erosion can be accelerated from their action.
- » An outline of general methods to monitor, manage and rehabilitate erosion in ensuring that all erosion caused by this development is addressed.

2. Scope

This document is an Erosion Management Plan which acts as a guideline to be applied by all contractors on the proposed housing development project. The objective of this plan is to control soil erosion in construction to enable conservation of the ecological value of the site by:

- » Reducing the effects of raindrop splash erosion on exposed soil surfaces.
- » Keeping rainwater on the soil surface for as long as possible to increase the infiltration rate and reduce surface runoff.
- » Reducing the speed of surface runoff to reduce the erosion effect of the soil surface.
- » Providing methods to retain soil, debris, seed banks and organic matter being carried away by runoff.
- » Improving water retention of the area (Coetzee, 2005).

3. Legislation and Standards

Soil conservation pertaining to erosion is regulated through several Acts and best practise guidelines. These include:

- » Conservation of Agricultural Resources Act No 43 of 1983
- » Environment Conservation Act No 73 of 1989
- » National Forests Act No 84 of 1998
- » National Environmental Management Act No 107 of 1998
- » The Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.

4. Specific Mitigation Measures

Table 8: Specific Mitigation Measures For Erosion Management and Control

Mitigation: Action/control	Responsibility	Timeframe
If erosion occurs, the contractor must undertake repairs timeously. Restorative repairs should include the backfilling and consolidation of eroded areas.	Contractor	Construction
All topsoil must be removed and stockpiled on the site.	Contractor	Construction
Stock piles should not be higher than 2m to avoid compaction.	Contractor	Construction
Stock piles to be covered to prevent soil loss by wind/ water.	Contractor	Construction
Dust suppression to be utilised for stockpiles, water/ a biodegradable chemical binding agent can be used.	Contractor	Construction
The ECO must assess the site for erosion indicators in the monitoring process.	ECO	Pre-construction
All cable trenches, etc. through sensitive area should be dug carefully in order to minimise damage to surrounding areas and potential for erosion.	Contractor	Construction
Disturbance of vegetation and topsoil will be kept to a practical minimum in order to minimise potential for erosion.	Contractor	Construction
Water velocity quantity must be reduced and diffused before water is returned to natural systems	Contractor	Construction
Channelling water through the area must be avoided as this is a dispersive environment. Drainage management must be controlled and implementing. Installing drainage systems through the substrate soil must be avoided.	Contractor	Construction
It may be necessary to use geotextiles and/or wind nets to limit wind erosion of exposed areas, where wind erosion could present difficulties and result in the loss of valuable topsoil.	Contractor	Site establishment & Construction
Any stockpiles will be protected against wind erosion (e.g. surrounded by shade cloth fences or damped down on a regular basis).	Contractor	
Use silt traps / bunds / reno mattresses to trap sediment wherever possible and re-vegetate affected areas as soon as is practical.	Contractor	Erection: Before construction Maintenance: Duration of contract
Vehicular traffic will be controlled during construction, confining access and roadways, where possible, to proposed or existing road alignments.	Contractor	Construction
Movement of vehicles on-site is to be on approved and formalised access roads only, which shall be adequately maintained throughout construction.	Contractor	Construction
Re-vegetate areas where there has been a loss of vegetation as soon as is practically possible.	Contractor	Construction
Limit the spatial extent of the areas in which the pre-development vegetation cover is reduced. After construction has been completed ensure exposed soil surfaces are rehabilitated with the replacement of topsoil (if relevant), scarification of the land-surface (if relevant) and re-	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
vegetation with an indigenous (shallow adventitious rooted) vegetation cover as soon as is practically possible. (Using plant species indigenous to the area).		

ALIEN INVASIVE SPECIES MANAGEMENT PLAN

CHAPTER 11

1. Purpose

The purpose of this plan is to guide management and control of alien and invasive plant species during the construction and operation of the housing development, through the implementation of an alien invasive species management and control programme. Alien plants replace indigenous vegetation leading to severe loss of biodiversity and change in landscape function. Potential consequences include loss of biodiversity, increased fire risk, increased erosion, increased water use etc.

In addition, the Conservation of Agricultural Resources Act (Act 43 of 1983), as amended in 2001, requires that land users clear *Declared Weeds* from their properties and prevent the spread of *Declared Invader Plants* on their properties.

Table 3 of CARA (the Conservation of Agricultural Resources Act) lists all declared weeds and invader plants. Alien plants are divided into 3 categories based on their risk as an invader.

- Category 1 - These plants must be removed and controlled by all land users. They may no longer be planted or propagated and all trade in these species is prohibited.
- Category 2 – These plants pose a threat to the environment but nevertheless have commercial value. These species are only allowed to occur in demarcated areas and a land user must obtain a water use license as these plants consume large quantities of water.
- Category 3 – These plants have the potential of becoming invasive but are considered to have ornamental value. Existing plants do not have to be removed but no new plantings may occur and the plants may not be sold.

The following guide is a useful starting point for the identification of alien species:
Bromilow, C. 2010. *Problem Plants and Alien Weeds of South Africa*. Briza, Pretoria.

2. Objectives

- » Ensure alien plants do not become dominant in parts or the whole landscape
- » Initiate and implement a monitoring and eradication programme for alien and invasive species
- » Control alien and invasive species dispersal & encroachment
- » Promote the natural reestablishment and planting of indigenous species

3. Status Quo

The site for the housing development is not in a pristine state and currently vacant land, with bare, exposed soils in most areas and scattered alien vegetation. No intact, significant areas containing Thornveld vegetation worth conserving were identified on the site. No protected plant or animal species were identified to occur on the site. The site currently comprises of a combination of bare, exposed soils, patches of disturbed grasses and scattered alien vegetation. The vegetation and trees that are scattered on the site comprises of alien species including:

- » *Eucalyptus globulus* (Blue Gum Trees);
- » *Prosopis glandulosa* (commonly called Prosopis or Mesquite Trees);
- » *Schinus molle* (Pepper tree),
- » *Opuntia ficus-indica* (Prickly pear); and
- » *Grevillea robusta* (Australian silky oak).

4. General Clearing & Guiding Principles for Removal of Alien Vegetation

- » Lighter infested areas should be cleared first to prevent the build-up of seed banks.
- » Dense mature stands of woody species where present should be left for last, as they probably will not increase in density or pose a greater threat than they are at the moment.
- » Collective management and planning with neighbours may be required as seeds of aliens are easily dispersed across boundaries by wind or water courses.
- » All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing.

5. Clearing Methods

- » Different species require different clearing methods such as manual, chemical or biological or a combination of both.
- » However care should be taken that the clearing method (s) used does not encourage further invasion. As such, regardless of the method (s) used, disturbance to the soil should be kept to a minimum. Fire is not a natural phenomenon at the site and fire should not be used as a clearing method or vegetation management approach at the site.
- » The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. <http://www.dwaf.gov.za/wfw/Control/>

6. Use of Herbicide for Alien Control

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien invasion and may

also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- » Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- » Specific care must be taken to prevent contamination of any water bodies. This includes: due care in storage, application, cleaning of equipment and disposal of containers, product and spray mixtures.
- » Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- » To avoid damage to indigenous or other desirable vegetation, products used should have least effect on non-target vegetation.
- » Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- » The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following guidelines should be followed:

Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.

7. Specific Mitigation measures for the Construction Phase

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Table 9: Specific Mitigation Measures For Control of Alien Invasive Species

Mitigation: Action/control	Responsibility	Frequency
The ECO is to provide permission prior to any vegetation being cleared for development.	ECO	Daily
Clearing of vegetation must be undertaken as the work front progresses – mass clearing is not allowed unless the entire cleared area is to be rehabilitated immediately.	Contractor	Weekly
Should re-vegetation not be possible immediately, the cleared areas must be appropriately protected to stabilise the soil.	Contractor	Weekly
Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides should not be used.	Contractor	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material for this purpose should be brought onto site. Brush from cleared areas should be used as much as possible. Arid soils are usually very low in organic matter and the use of manure or other soil amendments is likely to encourage invasion.	Contractor	Weekly
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving	Contractor	Weekly

Mitigation: Action/control	Responsibility	Frequency
equipment.) Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.		
Alien vegetation regrowth must be controlled throughout the entire site during the construction period.	Contractor	Monthly
The alien plant removal and control method guidelines should adhere to best-practice for the species involved. Such information can be obtained from the DWAF Working for Water website.	Contractor	Monthly
Clearing activities must be contained within the construction area.	Contractor	Daily
Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only.	Contractor	Monthly

8. Mitigation Measures for the Operational Phase

The following monitoring and evaluation actions should take place during the operational phase of the development.

- » Checks around plots and open spaces for alien invasive species should be conducted regularly, at least bi-annually. All aliens identified should be cleared.
- » Re-vegetation with indigenous, locally occurring species should take place in areas where natural vegetation is slow to recover or where repeated invasion has taken place.
- » Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.
- » No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used.

9. Mitigation Measures for the Decommissioning Phase

The following management actions are aimed at preventing the invasion, by alien plant species, of the re-vegetated areas created during the decommissioning phase:

- » Re-vegetation of the disturbed site is aimed at improving vegetative conditions for the site
- » All damaged areas shall be rehabilitated if the infrastructure is removed and the development is decommissioned.
- » All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction
- » Maintain alien plant monitoring and removal programme for 3 years after Rehabilitation.

OPEN SPACE MANAGEMENT PLAN

CHAPTER 12

1. Purpose

The purpose of the Open Space Management Plan is to provide a framework for the integrated management of the natural and semi-natural areas within housing development site. Given that the goal of the Open Space Management plan is to ensure the biodiversity compatible management of the development, it cannot be considered independently of the other environmental management sub-plans at the site. In particular the Erosion Management plan and Alien Invasive Management plan should be closely aligned with the Open Space Management plan.

2. Elements of the Open Space Management

The following elements are considered part of the Open Space Management plan

Maintenance

- » Alien invasive plants should be controlled according to the Alien Invasive Management Plan.
- » The open spaces to be maintained. Trees to be pruned regularly.

Access Control:

- » Access to the site and communal areas should be strictly controlled.
- » All visitors and contractors should be required to sign-in.
- » Signage at the entrance should indicate that disturbance to fauna and flora is strictly prohibited.

Prohibited Activities:

The following activities should not be permitted by anyone except the landowner or his representatives:

- No fires within the site.
- No hunting, collecting or disturbance of fauna and flora without appropriate permits.
- No driving off of demarcated roads.

Fire Risk Management:

Ignition risk sources in the area include the following:

- Lightning strikes
- The railway line which runs through the facility
- Personnel within the site

The National Veld and Forest Fires Act places responsibility on the landowner to ensure that the appropriate equipment as well as trained personnel are available to combat fires. Therefore, the management of the facility should ensure that they have suitable equipment as well as trained personnel available to assist in the event of fire.

Firebreaks

Targeted risk management should be implemented around vulnerable or sensitive elements of the housing development or high-risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and that burning to create firebreaks is not used as this in itself poses a risk of runaway fires. Where such firebreaks need to be built such as around substations, a strip of vegetation 5-10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing on an annual basis. However if alien species colonise these areas, more regular clearing should be implemented.

TRAFFIC MANAGEMENT PLAN

CHAPTER 13

The construction phase of the project will generating traffic due to transport of equipment and materials and construction crews to the site and the return of the vehicles after delivery of materials to the site. Specific measures for traffic management are provided in the table below.

Table 10: Specific Mitigation Measures For Traffic Management

Mitigation: Action/control	Responsibility	Timeframe
The two designated accesses to the proposed site must be created to ensure safe entry and exit.	Contractor	During Construction
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor, Transportation contractor)	During Construction
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	During Construction
Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor	During Construction
Appropriate maintenance of all vehicles must be ensured.	Contractor	During Construction
All vehicles travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	During Construction
Keep hard/compacted road surfaces as narrow as possible.	Contractor	During Construction
Utilise construction warning signage.	Contractor	During Construction
Vehicular movement beyond the property boundaries should be limited during peak hour	Contractor	During Construction
Access to the site must follow current and established routes. The contractor should be responsible for any damage caused to the road or road curb/verges.	Contractor	During Construction

RE-VEGETATION PLAN

CHAPTER 14

1. Overall Goal for the Rehabilitation of Disturbed Areas

Undertake the rehabilitation measures in a way that ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed. The objective of this plan is to guide appropriate rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

The main areas requiring rehabilitation will be remaining bares areas not occupied by houses, site boundaries, temporary access roads, any cable routings where these fall outside the above-mentioned areas, and any other disturbed areas around the site.

Table 10: Specific Mitigation Measures For Re-Vegetation

Mitigation: Action/control	Responsibility	Timeframe
Planting of indigenous trees along the boundaries of the development and in open spaces is recommended to provide ecosystem services and to act as natural wind breaks.	Contractor	Following execution of works
All temporary facilities, equipment, and waste materials must be removed from site as soon as practically possible after construction is complete.	Contractor	Following execution of works
All areas are to be cleared of rubble and construction waste remnants. This includes the removal of excess materials, which includes excavation and disposal of concrete and concrete wash water, and all the waste related thereto.	Contractor	Following the excavation of works.
All soil contaminated by hydrocarbons is to be excavated to the depth of contaminant penetration, removed and transported to an appropriate registered landfill site.	Contractor	Completion of construction activities in an area
All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Completion of construction activities in an area
Necessary anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Completion of construction activities in an area
The topography of the area must be restored, as far as possible, to the natural state of the level.	Contractor	Completion of construction

Mitigation: Action/control	Responsibility	Timeframe
		activities in an area
All compacted disturbed areas are to be tilled, following the landscapes contours to a depth of 150 mm before replacement of topsoil.	Contractor	Completion of construction activities in an area
Topsoil to be replaced and consistent with the surrounding natural environment and remain un compacted.	Contractor	Completion of construction activities in an area.
All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities should be undertaken as early as possible on disturbed areas.	Contractor	Completion of construction activities in an area
No exotic plants may be used for rehabilitation purposes; only indigenous plants from the area may be utilised. No chemical based fertilizers may be used.	Contractor	Completion of construction activities in an area
Topsoil stored for longer than 6 months must be vegetated.	Contractor	Completion of construction activities in an area
Replacement of soil types must be done so as to match the baseline soil profile as closely as possible.	Contractor	Completion of construction activities in an area
The seed mix for use in rehabilitation must be a mix of indigenous grass species common to the area.	Contractor	Prior to the start of rehabilitation
Seeding operations must coincide with rainfall events or as part of a managed watering schedule	Contractor	Completion of construction activities in an area

ENVIRONMENTAL MONITORING PROGRAMME

CHAPTER 15

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). Where this is not clearly dictated, Transnet will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications
- » Ensure adequate and appropriate interventions to address non-compliance
- » Ensure adequate and appropriate interventions to address environmental degradation
- » Provide a mechanism for the lodging and resolution of public complaints
- » Ensure appropriate and adequate record keeping related to environmental compliance
- » Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site
- » Aid communication and feedback to authorities and stakeholders.

The ECO will ensure compliance with the EMPr, and t conduct monitoring activities. The ECO must have the appropriate experience and qualifications to undertake the necessary tasks. The ECO will report any non-compliance or where corrective action is necessary to the Construction Manager and/or any other monitoring body stipulated by the regulating authorities.

The following reports will be applicable:

6.1 Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Construction Manager. Non-conformance reports will describe, in detail, the cause, nature and

effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Construction Manager and ECO.

6.2 Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis during construction and must be submitted to DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out.

6.3 Final Audit Report

A final environmental audit report must be compiled by the ECO and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e.: within 30 days of site handover) and within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.