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# DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

**FOR THE**

## HARTENBOS WASTEWATER TREATMENT WORKS PV SOLAR PLANT AND BATTERY STORAGE SYSTEMS ON REMAINDER OF PORTION 101 OF THE FARM NO. 217, HARTENBOS, MOSSEL BAY, WESTERN CAPE PROVINCE

APPLICATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998  
(ACT NO. 107 OF 1998), AS AMENDED, AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014

**PREPARED FOR:** Mossel Bay Municipality  
101 Marsh Street,  
Mossel Bay  
6500

**DATE:** 04 January 2023

**DEADP REF NO:** 16/3/3/1/D6/18/0033/23  
**SES REF NO:** 01/HWWTW/PVSP/MBM/11/23

- 
- Environmental Impact Assessments • Basic Assessments • Environmental Management Planning
  - Environmental Control & Monitoring • Water Use License Applications • Aquatic Assessments



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**Appendix 4 of the EIA Regulations 2014 (as amended 2017).**

This Environmental Management Programme has been drafted in accordance with Appendix 4 of the Environmental Impact Assessment Regulations 2014 (as amended 2017). The table below shows how the requirements of Appendix 4 have been included within this Environmental Management Programme.

|  |   |
|--|---|
| (l) An EMPr must comply with section 24N of the Act and include—<br>(a) details of—<br>(i) the EAP who prepared the EMPr; and<br>(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;  | Appendix G- EAP CV  |
| (b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;   | Section 4 – Description of the Activity   |
| (c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;  | Section 4 - Description of the Activity   |
| (d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including—<br>(i) planning and design;<br>(ii) pre-construction activities;<br>(iii) construction activities;<br>(iv) rehabilitation of the environment after construction and where applicable post closure; and<br>(v) where relevant, operation activities;  | Section 9 - Environmental Impact Management: Planning and Design Phase<br>Section 10 - Environmental Impact Management: Pre-construction Phase<br>Section 11 - Environmental Impact Management : Construction Phase<br>Section 12 - Environmental Impact Management : Post Construction Rehabilitation Phase & Operational Phase  |
| (f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to —<br>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;<br>(ii) comply with any prescribed environmental management standards or practices;<br>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and<br>(iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable; | Section 9 - Environmental Impact Management: Planning and Design Phase<br>Section 10 - Environmental Impact Management: Pre-construction Phase<br>Section 11 - Environmental Impact Management: Construction Phase<br>Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase  |
| (g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);  | Section 15 - Roles and Responsibilities<br>Section 17 - Monitoring, Record Keeping and Reporting  |
| (h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);   | Section 15 - Roles and Responsibilities<br>Section 17 - Monitoring, Record Keeping and Reporting  |
| (i) an indication of the persons who will be responsible for the implementation of the impact management actions;  | Section 9 - Environmental Impact Management: Planning and Design Phase<br>Section 10 - Environmental Impact Management: Pre-construction Phase<br>Section 11 - Environmental Impact Management: Construction Phase<br>Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase<br>Section 15 - Roles and Responsibilities |
| (j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;   | Section 9 - Environmental Impact Management: Planning and Design Phase<br>Section 10 - Environmental Impact Management: Pre-construction Phase  |

## Environmental Management Programme

|  |   |
|--|---|
|  | <p>Section 11 - Environmental Impact Management: Construction Phase</p> <p>Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase &amp; Operational Phase</p>   |
| (k)the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);   | <p>Section 15 - Roles and Responsibilities</p> <p>Section 17 - Monitoring, Record Keeping and Reporting</p>   |
| (l)a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;   | <p>Section 9 - Environmental Impact Management: Planning and Design Phase</p> <p>Section 10 - Environmental Impact Management: Pre-construction Phase</p> <p>Section 11 - Environmental Impact Management: Construction Phase</p> <p>Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase &amp; Operational Phase</p> <p>Section 15 - Roles and Responsibilities</p> <p>Section 17 - Monitoring, Record Keeping and Reporting</p> |
| (m)an environmental awareness plan describing the manner in which—<br>(i)the applicant intends to inform his or her employees of any environmental risk which may result from their work; and<br>(ii)risks must be dealt with in order to avoid pollution or the degradation of the environment; and | Section 15 - Roles and Responsibilities   |
| (n)any specific information that may be required by the competent authority.   | tbd   |

## DOCUMENT DETAILS

|                           |  |
|---------------------------|--|
| <b>Project Ref. No:</b>   | 01/HWWTW/PVSP/MBM/11/23  |
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**Sharples Environmental Services cc (SES)** has been actively engaged since 1998 in the fields of environmental planning, assessment and management. Clients include private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. The consultants have over 40+ years of combined experience and operate in the Southern, Eastern and Western Cape regions.

#### MICHAEL BENNETT (**Environmental Assessment Practitioner, Report Writer**):

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Carla obtained her Bachelor of Science Honours Degree in Environmental Sciences from the North-West University. Carla joined the SES team in 2022 and is gaining experience in conducting assessments by working with and being mentored by her experienced colleagues.

#### JOHN SHARPLES (**Managing Director**) -

John started Sharples Environmental Services in 1998 and has overseen the company's growth and development since then. John also started the Cape Town office in 2010. John holds a Masters in Environmental Management from the University of the Free State as well as a Bachelor's degree in Conservation. He has consulted for 18 years running a team of highly trained and qualified consultants and prior to this gained 12 years of experience working for environmental organizations. John is registered with EAPASA as a certified Environmental Practitioner.



## 1. Introduction

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*Sharples Environmental Services cc (SES)* has been appointed by *the Mossel Bay Municipality*, to complete the Environmental Management Programme (EMPr) as part of the Basic Assessment Process for the Proposed Hartenbos Wastewater Treatment Works PV Solar Plant and Battery Storage Systems on Remainder of Portion 101 of the Farm no. 217, Hartenbos, Mossel Bay.

The proposed development will trigger listed activities in terms of the Amended Environmental Impact Assessment Regulations of 2014 (GN No. R.324 - 327 of 7 April 2017). Environmental Authorisation is therefore required from the competent authority (Western Cape Department of Environmental Affairs & Development Planning) before construction can commence.

## 2. About this EMPr

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This document is intended to serve as a guideline to be used by *the Mossel Bay Municipality* (as the Implementing Agent) and any person/s acting on behalf of *Mossel Bay Municipality*, during the pre-construction, construction, post-construction, and rehabilitation phases of the proposed upgrade and development. This document provides measures that must (where practical and feasible) be implemented to ensure that any environmental degradation that may be associated with the development is avoided, or where such impacts cannot be avoided entirely, are minimised, and mitigated appropriately.

This EMPr has been prepared in accordance with the requirements of an EMPr as specified in the Amended Environmental Impact Assessment Regulations, 2014 (GN No. R. 326 of 7 April 2017), and with reference to the "Guidelines for Environmental Management Programmes" published by the Department of Environmental Affairs and Development Planning (2005).

It is important to note that the EMPr is not designed to manage the physical establishment of the upgrade and development *per se* but should rather be seen as a tool which can be used to manage the environmental impacts of the development.

The rehabilitation, mitigation, management, and monitoring measures prescribed in this EMPr must be seen as binding to the *Mossel Bay Municipality*, and any person acting on its behalf, including but not limited to agents, employees, associates, guests, or any person rendering a service to the development site.

### 2.1 Important caveat to the report

In the past, some developments have had a devastating impact on the environment even though they have had Environmental Management Programmes in place, while other developments have had a low impact even though no management plans have been compiled.

The Implementing Agent and the attitude of the construction team play an integral role in determining the impact that the development will have on the environment. The ECO (see Chapter 15) needs to ensure that all role-players are "on board" with regard to the constraints that the EMPr places on the development and construction team. The end result relies on cooperation and mutual respect and understanding of all parties involved.

### 3. How to use this document

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It is essential that this EMPr be carefully studied, understood, implemented, and adhered to as far as reasonably possible, throughout all phases of the proposed development. The *Mossel Bay Municipality* must retain a copy of this EMPr, and another copy of this EMPr must be kept on site at all times during the pre-construction, construction, and post-construction rehabilitation phases of the development.

This EMPr must be included in all contracts compiled for contractors and subcontractors employed by *Mossel Bay Municipality* as this EMPr identifies and specifies the procedures to be followed by engineers and other contractors to ensure that the adverse impacts of construction activities are either avoided or reduced. *Mossel Bay Municipality* and any appointed contractors must make adequate financial provision to implement the environmental management measures specified in this document.

This EMPr must be seen as a working document, which may be amended from time to time as needed, in order to accommodate changing circumstances on site or in the surrounding environment, or in order to accommodate requests/ conditions issued by the competent authority, the Department of Environmental Affairs & Development Planning. Amendments to this EMPr must first be approved by the competent authority, in writing.

### 4. Background and Location of the activity

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#### 4.1 Background and description

The Mossel Bay Municipality (MBM) aims to improve quality of life within its supply area by improving energy efficiency, availability, and reliability. MBM is therefore embarking on a journey of implementing embedded generation (own generation) and energy storage alternatives and thereby contributing to sustainable growth and development in the area through reliable and cost-effective energy provision within its area of jurisdiction.

Considering the current problems experienced within Eskom in terms of availability and reliability of electrical energy supply, Mossel Bay Municipality recognises the need for planning more sustainable approaches to their energy production and distribution, to promote economic development and meet social needs while at the same time reducing local and global environmental impacts.

The aim of the proposed solution was to design a hybrid system that will be grid-tied under normal operating conditions, providing battery backup as first line of support when the grid supply is interrupted. Furthermore, standby diesel generators will also be incorporated into the system design to serve as a final level of support to the load when the batteries are depleted, and the grid supply (or PV solar generation) remains unavailable.

In summary, it can be concluded that the proposed hybrid system will consist of the following:

- a) 1760 kVA grid-tied, free-field solar PV installation (requiring  $\pm 20\,000\text{m}^2$  installation area).
- b) Installation of 3692 x 550Wp Mono-crystalline Solar Panels, which convert the solar radiation into direct current.
- c) Fixed tilt ground mounting structures, which supports the PV modules.
- d) 5x String inverters, which convert the DC from the solar field to AC.
- e) 1x MV Inverter Station (3.2MVA), which collects the AC output from each of the inverters and incorporates a step-up power transformer, which steps the inverter output voltage up to the 11kV network voltage. The inverter station also has integrated 11kV switchgear to connect to the MV network.



- f) 4512 kWh Battery Energy Storage System (consisting of 2x 2256kWh batteries in containers).
- g) 1x 1.757 MVA Power Conversion System (PCS), which converts the DC battery output to AC power.
- h) 1x 1.6 MVA Isolation transformer, which steps the PCS output up to 11kV.
- i) 2x 800 kVA Backup Diesel Generators (containerised).
- j) 1x 1.6 MVA Step-up transformer, which steps the generator output up to 11kV.
- k) 6x 11kV (25kA) AIS switchgear panels, complete with associated protection, metering and control elements, to be housed in a new substation building.
- l) 1x 11kV Neutral Earthing Resistor (NER), to be installed on the star-point of the generator stepup transformer's MV winding.
- m) DC cables (LV).
- n) AC cables (LV & MV).
- o) Energy Management System.
- p) Communication Network.

#### 4.2 Site Location and Development Plan

The proposed site is on Remainder of Portion 101 of the Farm Hartenbosch 217 which is located in Hartenbos North, Mossel Bay Municipality, Western Cape.

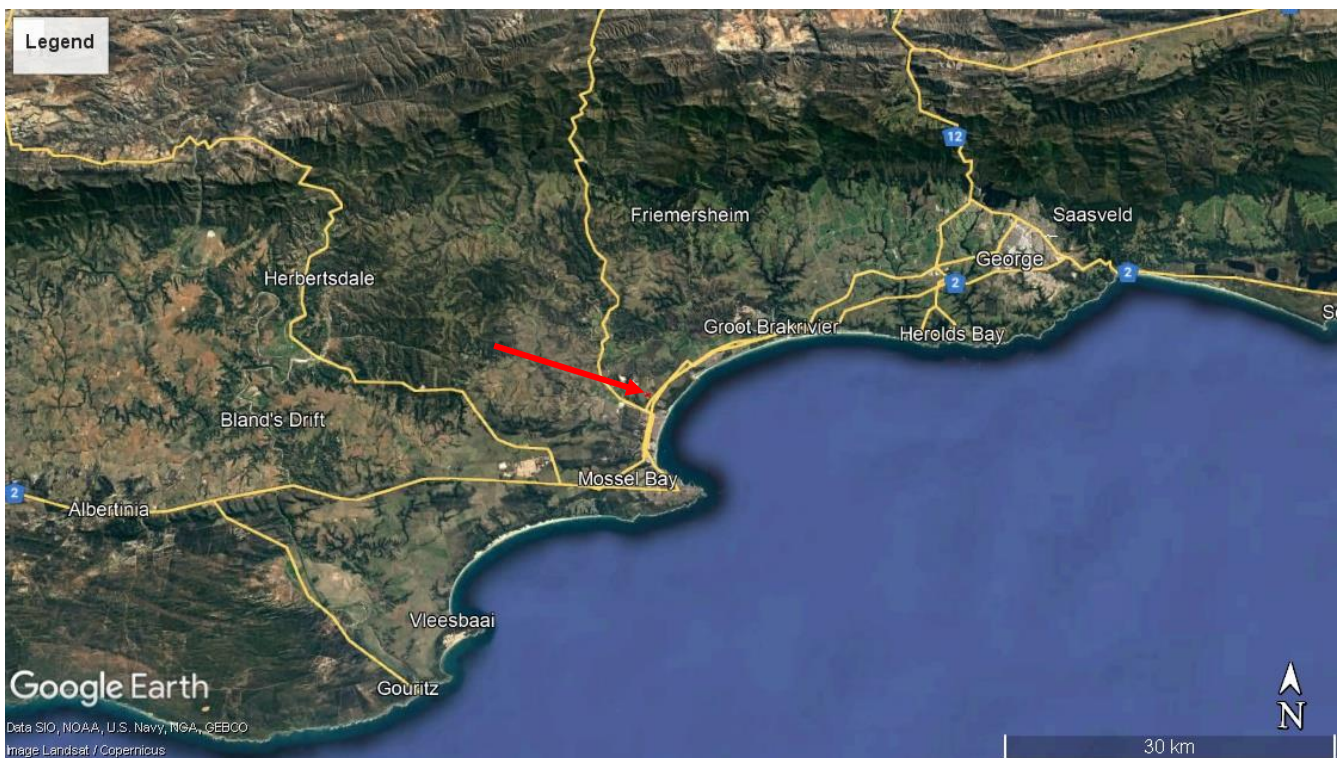


Figure 1: Approximate Locality of the Hartenbos WWTWs.

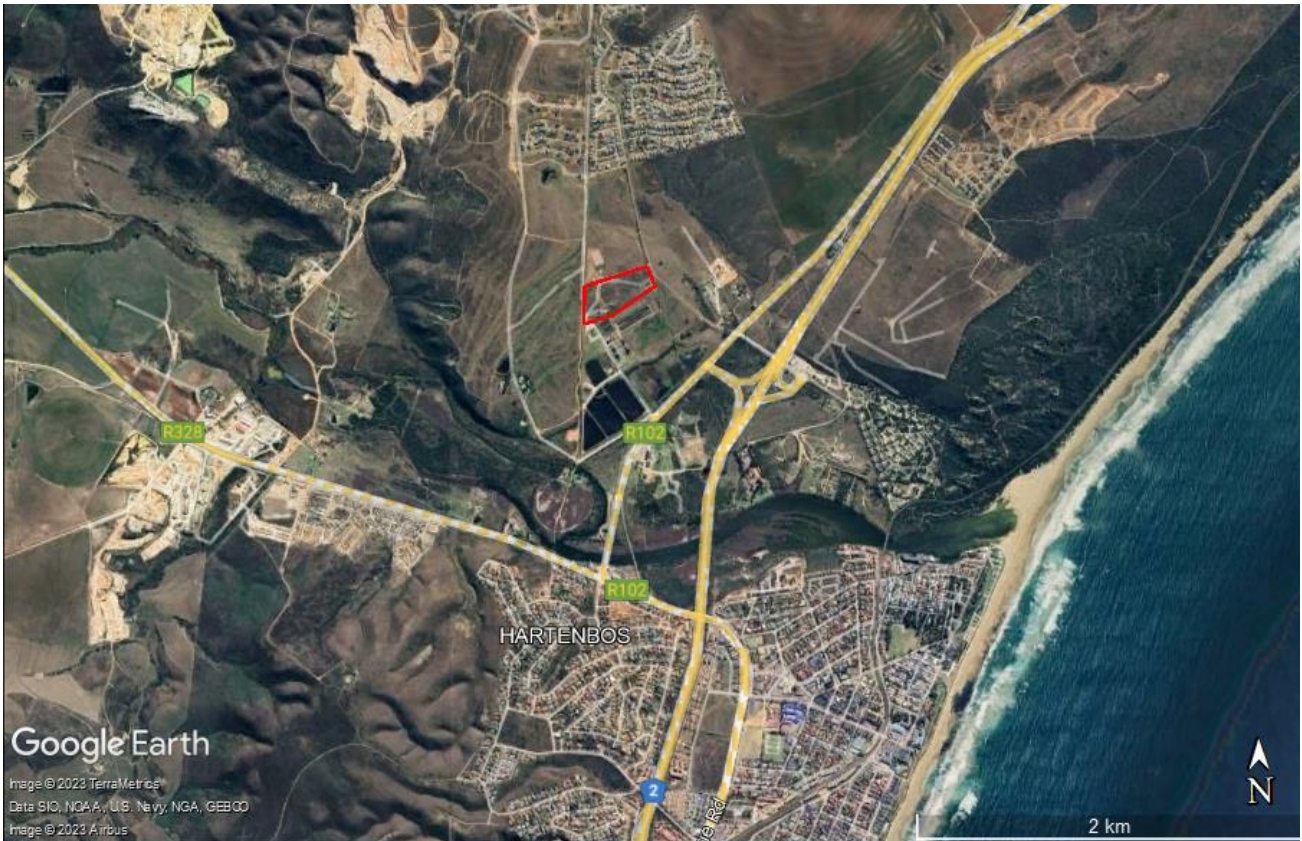


Figure 2: Closer view - Locality of the Hartenbos WWTWs and PV Solar site.

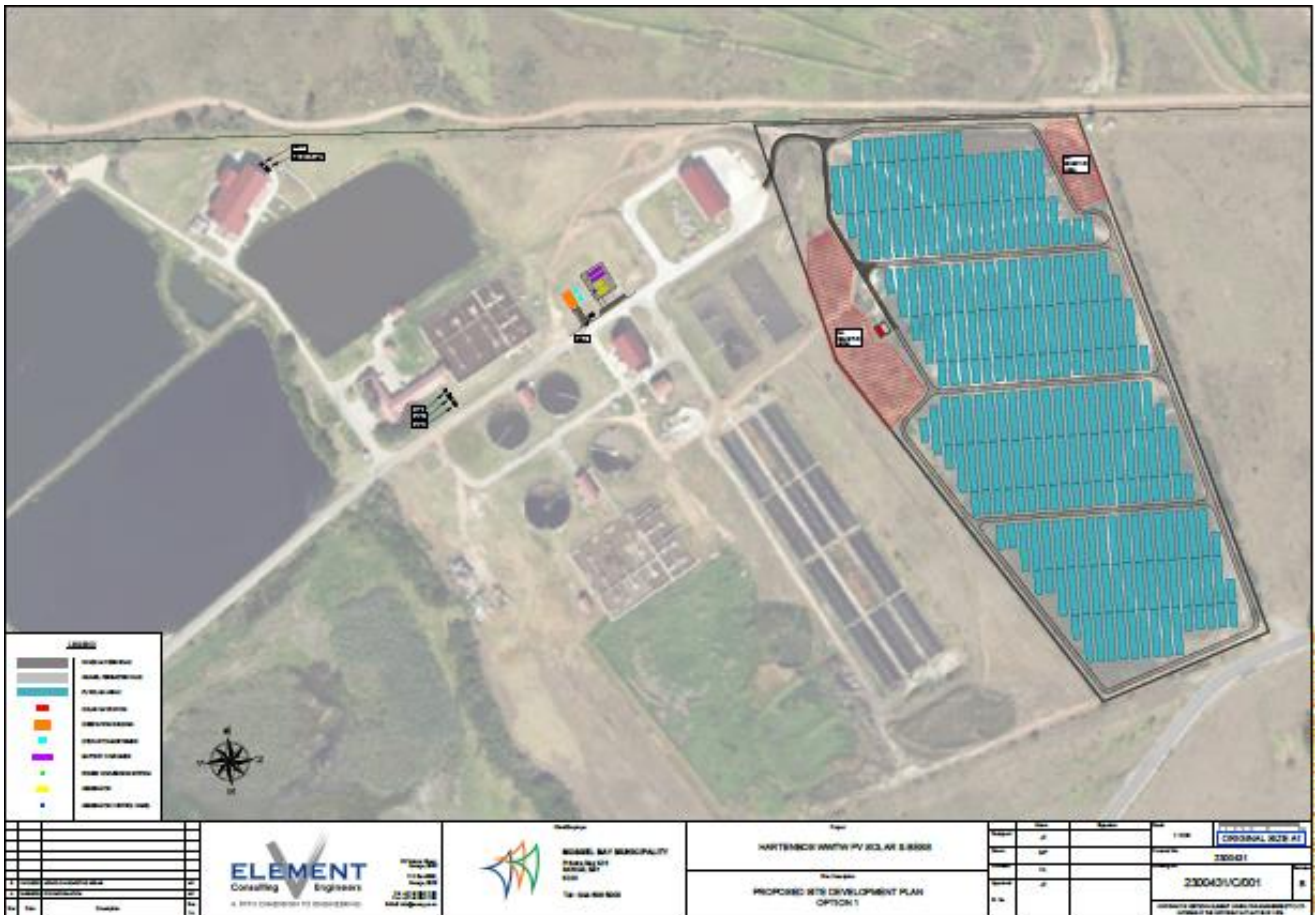


Figure 3: Site development plan

**Table 1:** Summary Table: Site and Property Details

|                              |  |
|------------------------------|--|
| <b>Province</b>              | Western Cape                                 |
| <b>District Municipality</b> | Garden Route District Municipality           |
| <b>Local Municipality</b>    | Mossel Bay Municipality                      |
| <b>Ward number</b>           | Ward 4                                       |
| <b>Erf name</b>              | Remainder of Portion 101 of the Farm no. 217 |

## 5. Description of Environmental Setting

### 5.1 Vegetation description

According to the 2018 Vegetation Map of South Africa, the site is located inside **Mossel Bay Shale Renosterveld**. The latter occurs on the coastal plains (undulating hills) and valleys from the Kruisrivier near Riversdale to Klein Brak River, centred on the Gouritz River (Mucina, 2006). The renosterveld is described as a medium dense, medium tall cupressoid-leaved shrubland dominated by renosterbos (*Elytropappus rhinocerotis*) (Mucina, 2006). Thicket patches and thicket elements are also common. Apart from a few pioneer renosterveld species recorded in the regrowth, a few thicket elements were also noted.

**The vegetation of the site**, as described by Mr. M. Berry.

The vegetation covering the site can be described as an alien herbland, with a few small patches of thicket in the north-western corner and on the southern side. Structurally, it can be classified as a low (0.3-1.0 m) closed shrubland following Campbell's classification (Campbell, 1981). The dominant species are all herbaceous weeds and grasses such as *Chenopodium*, *Pseudognaphalium undulatum* and *Cenchrus clandestinus*. Due to the severity of past land-use activities (agriculture and dumping), it is highly unlikely that it will return to natural vegetation. The thicket patches, which are also degraded, include typical thicket species such as *Aloe ferox*, *Sideroxylon inerme*, *Schotia afra*, *Searsia pterota*, *Euclea undulata* and *Carissa bispinosa*.

Alien species are abundant throughout the site, including *Acacia cyclops* (rooikrans, 1b), *Senna cf multiglandulosa* (buttercup bush), *Helminthotheca echioides* (ox tongue), *Sonchus oleraceus* (sowthistle), *Cirsium vulgare* (spear thistle, 1b), *Datura stramonium* (thorn apple, 1b), *Ricinus communis* (castor-oil plant, 2), *Trifolium repens* (white clover), *Myoporum laetum* (New Zealand manitoka, 3), *M. insulare* (manitoka, 3), *Lantana camara* (lantana, 1b), *Opuntia ficus-indica* (prickly pear, 1b), *Agave americana* (garingboom, 3), *Yucca aloifolia* (yucca), *Phytolacca octandra* (inkberry, 1b), *Chenopodium sp*, *Plantago lanceolata* (buckhorn plantain), *Erodium moschatum* (musk heron's bill), *Malva parviflora* (cheese weed), *Malva arborea* (tree mallow), *Sida poeppigiana*, *Cannabis sativa* (dagga), *Hirschfeldia incana* (Mediterranean mustard), *Lysimachia foemina* (blue pimpernel) and *Cenchrus clandestinus* (kikuyu, category 1b in protected areas). *Chenopodium sp* and *Cenchrus clandestinus* are dominant.

As indicated above, nearly half of these species are Categories 1b, 2 and 3 invaders in the Western Cape. In terms of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) Alien and Invasive Species List (2016), Category 1b invasive species require compulsory control as part of an invasive species control programme. Further in terms of the above Act, the harbouring of castor-oil plant (Category 2 invader) on a property is prohibited without a permit. Its fruits are extremely toxic to humans and animals, with just one fruit being potentially fatal (Bromilow, 2010). The high presence of aliens on the site is indicative of past disturbances (agricultural activities and dumping).

Two SCC were recorded on the site, namely *Hermannia lavandulifolia* (VU) and *Carpobrotus murii* (NT). Both are still very common in the Mossel Bay area. A single milkwood, a protected tree species, was also recorded in one of the thicket patches on the southern side of the site.



**Figure 4: A few indigenous species recorded on site, with *Drosanthemum floribundum* (top left), *Carpobrotus murii* (top right), *Hermannia lavandulifolia* (bottom left) and *Searsia pterota* (bottom right).**

## **5.2 Freshwater features**, as described by Dr. James Dabrowski:

Historically the site and surrounding areas has been constantly disturbed, and a berm is present in the north-east corner of the site. Apart from this berm, the topography is relatively uniform and there are no obvious areas of natural drainage on the site and no natural hydro-geomorphological landscape features (depressions, confined valleys, channels etc.) indicating the presence of a watercourse (i.e., stream, river or wetland). The berm does create a slight depression where water is likely to accumulate periodically. This has resulted in the establishment of a small patch of *Phragmites australis* which provides no ecological function from an aquatic biodiversity perspective. The site is and has been used as a dump site for the solid waste from the WWTWs and there was evidence of dried sludge and other non-biodegradable waste dumped throughout the site.

## **6. Legal Framework**

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### **6.1 Environmental Impact Assessment Regulations (2017)**

The following listed activities, in terms of the amended Environmental Impact Assessment Regulations, 2017 (GN No. R. 324 – 327) will be triggered by the proposed development:

**Table 2: Listed activities in terms of the amended Environmental Impact Assessment Regulations (2017)**

| Listed Activity No(s): | Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 1 (GN No. R. 983)  |
|------------------------|--|
| 1.                     | <p><b>The expansion and related operation of infrastructure for the bulk transportation of sewage, The development of facilities or infrastructure for the generation of electricity from a renewable resource where—</b></p> <p>(i) the electricity output is more than 10 megawatts but less than 20 megawatts;<br/>or<br/><b>(ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare;</b><br/>excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs—<br/>(a) within an urban area; or<br/>(b) on existing infrastructure.</p>  |
| 12                     | <p><b>The development of—</b><br/>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or<br/><b>(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—</b><br/>(a) within a watercourse;<br/>(b) in front of a development setback; or<br/><b>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</b><br/>excluding—<br/>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;<br/>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;<br/>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;<br/>(dd) where such development occurs within an urban area;<br/>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or<br/>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p> |
| 27                     | <p><b>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation,</b> except where such clearance of indigenous vegetation is required for—<br/>(i) the undertaking of a linear activity; or<br/>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>  |
| Listed Activity No(s): | Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 3 (GN No. R. 985)  |
| 12                     | <p><b>The clearance of an area of 300 square metres or more of indigenous vegetation</b> except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p><b>i. Western Cape</b><br/><b>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</b><br/>ii. Within critical biodiversity areas identified in bioregional plans;<br/>iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</p>  |

|  |  |
|--|--|
|  | <p><b>iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or</b><br/> v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.</p> |
|--|--|

## 6.2 Other applicable legislation

Mossel Bay Municipality, is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on their behalf, remain compliant with the conditions of the received environmental authorisation and water-use authorisations, as well as the provisions of all other applicable legislation, including *inter alia*:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Forest Act (Act No 84 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);

The above listed legislation have general applicability to most development applications, and it is Mossel Bay Municipality responsibility to ensure that all contractors and employees are aware of their obligations in terms of these Acts. This EMPr does not detract from any other legal requirements.

## 7. Scope of this EMPr

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This EMPr describes the measures that must be implemented in order to avoid, minimise, manage and monitor the potential environmental impacts of the development, during all phases of the project life cycle, namely:

- Planning and Design Phase
- Pre-construction Phase
- Construction Phase
- Operational Phase

General environmental management measures that must be applied throughout the project lifecycle (as and where applicable) are described in Chapter 8. Additional management measures that must be implemented to address specific impacts that may arise during each phase are provided in **Chapters 9-12** of this EMPr.

## 8. General Environmental Management

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The following general management measures are intended to protect environmental resources from pollution and degradation during all phases of the project life cycle. These measures must be implemented as and where applicable, reasonable and practicable during the pre-construction, construction and post-construction and rehabilitation phases of the proposed development.

### 8.1 Site access and traffic management

Access to the facility is obtained from the R102 Main Road, via a tarred road on the southern boundary of the site, through a controlled access gate.



**Figure 5: Site Access from the R102.**

In general, all construction vehicles need to adhere to traffic laws. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far as possible care must be taken to ensure that the local traffic flow pattern is not too significantly disrupted, and all vehicle operators therefore need to be educated in terms of “best-practice” operation to minimise unnecessary traffic congestion or dangers. Construction vehicles must therefore not unnecessarily obstruct the access point or traffic lanes used to access the site. Construction vehicles also need to consider the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles. Adequate signage that is both informative and cautionary to passing traffic (motorists and pedestrians) warning them of the construction activities. Signage would need to be clearly visible and need to include, among others, the following: (only where necessary)

- Identifying working area as a construction site;
- Cautioning against relevant construction activities;
- Prohibiting access to construction site;
- Clearly specifying possible detour routes and / or delay periods;
- Possible indications of time frames attached to the construction activities, and;
- Listings of which contractors are working on the site.

Other mitigation measures include:

- ECO to do awareness training with the contractor and labourers before construction commences.
- Ensure appropriate behaviour of operators of construction vehicles.

## **8.2 Site demarcation**

The following areas must be clearly demarcated on site during the pre-construction or construction phases of the development, as appropriate.

### 8.2.1 Construction working area

Prior to the commencement of any construction activities, the outer boundary of the development area must be surveyed and pegged. The demarcation boundary must be tight around the site, typically allowing a working area of no more than 2.5 m around the development footprint. This demarcation boundary is to ensure that construction activities are restricted to only that area strictly required for the proposed development, and to prevent unnecessary disturbance of soil surfaces and vegetation outside of the development footprint.

### 8.2.2 No-go areas

Prior to the commencement of any construction activities, all No-Go areas, must be demarcated and must not be disturbed during the construction phase.

No-go areas must be off-limits to all construction workers, vehicles, and machinery during all phases of the development. No vegetation may be cleared from within the no-go areas, and no dumping of any material (waste, topsoil, subsoil etc.) may occur in these areas. Construction workers must be informed of the no-go areas, and if necessary appropriate signage and/or temporary fencing (e.g., droppers with danger tape) can be used to enforce the no-go areas.

Please refer to Figure 6 for the suggested No-Go area of the site.



**Figure 6: Suggested No-Go areas in red.**

### 8.2.3 Demarcation of the site camp

The area chosen for the site camp and associated facilities must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. It is recommended that easily accessible, transformed areas around the WWTW are used for the site camp. Site selection must be done in consultation with the ECO.



### **8.3 Site camp and associated facilities**

The following general management measures pertaining to the set-up, operation and closure of a site camp must be applied where appropriate, reasonable and practicable:

#### **8.3.1 Fencing & Security**

The site camp area must be secured to prevent any un-authorised individuals from entering the site camp and possibly getting injured or posing a safety and/or security risk. Adequate signage must be displayed, designating the site office / camp as a restricted area to non-personnel. If required, the site camp and associated areas may be fenced off along the demarcated boundaries of these areas, preferably with 2 m high fence and shade netting or similar.

#### **8.3.2 Fire Fighting Equipment**

No less than 2 fire extinguishers must be present in the site camp. The extinguishers must be in a working condition and within their service period. A fire extinguisher must always be present wherever any "hot works" (e.g., welding, grinding etc.) are taking place. It is recommended that all construction workers receive basic training in fire prevention and basic fire-fighting techniques and are informed of the emergency procedure to follow in the event of accidental fires. No open fires may be made on the construction site during any phase of the project. Construction workers may make small, contained fires (e.g., for warming or cooking purposes), within the site camp provided the small fire is encircled by a corrugated iron structure, drum or similar, to prevent wind-blown cinders from causing fires elsewhere. Such fires may not be left unattended and must be thoroughly extinguished after use. No smoking must be allowed on the construction site. In the case of accidental fires, the contractor must (if required) alert the Local Authority's Fire Department as soon as a fire starts prior to the fire becoming uncontrollable.

#### **8.3.3 Waste Storage Area**

Sufficient bins for the temporary storage of construction related waste must be provided inside the site camp and/or at the working area and should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. Label each waste receptacle for waste separation, and ensure waste is contained either by use of lids or by ensuring waste receptacles are emptied prior to filling up, making them susceptible to wind dispersion. Sufficient signage and awareness should be created to ensure that these bins are properly used.

According to the Preliminary Design Report provided by the appointed engineers, a formal solid waste collection area will be provided as part of the solid waste system of the existing WWTW and be collected in line with this arrangement.

#### **8.3.4 Hazardous Substances Storage Area**

Fuels, chemicals, lubricants and other hazardous substances must be stored in a demarcated, secured and clearly sign-posted area within the site camp away from the watercourses on site. Sufficient signage and awareness should be created to ensure that these bins are properly used. Ensure that when substances are transferred, this is done on an impermeable and/or bunded surface, to contain any spillage. Spillage, should it occur, should be disposed of appropriately.

#### **8.3.5 Potable Water**

An adequate supply of potable water must be provided to construction workers at the site camp. It is the Contractors duty to ensure that the labour has adequate access to potable water throughout construction phase, and to monitor weather conditions, to ensure that labour has enough drinking water on hotter days, or construction activity must cease, until conditions are safe to continue.

The site will be serviced via the existing water infrastructure from the Hartenbos Regional WWTW.

### 8.3.6 Ablution Facilities

No new sewer infrastructure will be constructed or installed for this development. All sewer generated will be through the existing infrastructure at the Hartenbos Regional WWTW, i.e., existing offices and ablutions.

### 8.3.7 Eating Area & Rest Area

A dedicated area within which construction workers can rest and eat during breaks should be provided within the site camp. Seating and shade should be provided.

### 8.3.8 Vehicle & Equipment Maintenance Yard

Where possible, construction vehicles and equipment that require repair must be removed from site and taken to a workshop for servicing. If emergency repairs and/or basic maintenance of construction vehicles or equipment are necessary on site, such repair work must be undertaken within the designated maintenance yard area away from any watercourses. Repairs must be conducted on an impermeable surface, and/or a tarpaulin and/or drip trays must be laid down prior to emergency repairs taking place, in order to prevent any fuel, oil, lubricant or other spillages from contaminating the surrounding environment.

### 8.3.9 Housekeeping

The site camp and related site camp facilities must be kept neat and orderly at all times, in order to prevent potential safety risks and to reduce the visual impact of the site during construction.

## **8.4 Vegetation clearing**

Where vegetation must be cleared the following measures must be implemented where applicable, reasonable and practical:

- Where feasible vegetation must simply be trimmed to facilitate access/ construction, rather than being completely cleared or removed.
- Vegetation clearing/trimming must be cleared by hand (i.e., brush cut) and stockpiled for use as mulch/ brush-packing during rehabilitation of the site. Any alien vegetation that is cleared must be disposed of in consultation with the ECO, unless the cleared alien vegetation does not contain seeds in which case it may be retained for use in site rehabilitation.
- No bulldozing must be undertaken for the purpose of vegetation clearing.
- Only the areas required to accommodate the construction activities and access to the construction site must be cleared/trimmed of vegetation.
- Vegetation outside of the construction footprint and beyond any No-Go areas must not be cleared.
- As a duty of care measure, indigenous succulent and bulb species (e.g., *Carpobrotus* species) can be searched and rescued to be replanted in suitable rehabilitation areas on site after construction. *Carpobrotus* species are useful soil binders.

## **8.5 Topsoil and subsoil management**

It is recommended that topsoil be removed from any area where physical disturbance of the surface will occur, including within the footprint of the development site (working area) and possibly within the site camp, ablution area, vehicle maintenance yard, refuelling area and temporary waste storage area. Topsoil removal and stockpiling must be undertaken only after consultation with the ECO.

- Removed topsoil and subsoil must be stockpiled for the duration of the active construction period and utilised for the final landscaping and rehabilitation of disturbed areas on site.
- The removed topsoil must be stockpiled in a berm, in a demarcated area as agreed with the ECO.
- Removed subsoil must be stockpiled separately from topsoil.
- The topsoil & subsoil storage area must be located on a level area outside of any surface drainage channels and at a location where it can be protected from disturbance during construction and where it will not interfere with construction activities.
- Where applicable topsoil and subsoil stockpiles must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth or other suitable measures must be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles must not be covered with tarpaulin, as this may smother and decrease the virility of topsoil.
- Handling of topsoil must be minimised as much as possible, and the location of the topsoil berm must be chosen carefully to avoid needing to relocate the topsoil berm at a later date. The ECO must be consulted with regards to the placement of the stockpiles, to ensure that the selected location is in compliance with this EMP and EA (once granted).
- Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.
- If soil stockpiles will be stored for an extended period of time, the stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
- Spoil material that will not be re-utilised on site may be removed from site and taken to an appropriate site for re-use or disposal.
- Note that the topsoil must be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.

### 8.6 Integrated waste management approach

It is recommended that an integrated waste management system is adopted on site. The system must be based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Waste bins for the different categories of recyclable waste (i.e., paper, plastic, metal) must be provided on site. These bins must be emptied, and the waste must be taken to a registered recycling facility. The receipts from the facility must be kept on file and must be available on request. Images 1 and 2 show two such systems within a construction site.



**Image 1:** Recycling system implemented on a construction site. Skips provided for general waste, plastic, cardboard and metal.



**Image 2:** Recycling system implemented on a construction site. Lidded bins provided for general waste, plastic, cardboard, and metal.

The non-recyclable and non-reusable waste (e.g., builder's rubble, etc.) generated on site must be stored and disposed of at a landfill site licensed in terms of the applicable legislation.

According to the Preliminary Design Report provided by the appointed engineers, a formal solid waste collection area will be provided as part of the solid waste system of the existing WWTW and be collected in line with this arrangement.

### **8.7 Hazardous substances and fuels**

If hazardous substances and fuels such as diesel, oil, lubricant, detergents etc. are to be stored on site for construction purposes, a designated area must be set aside for this within the site camp.

- All hazardous substances must be stored in the designated area within the site camp.
- The area selected for storage of hazardous fuels must be located on a level area, well outside of any water courses, water bodies or surface drainage channels.
- The designated area must be clearly demarcated and secured by use of fencing and/or cages, to prevent access by un-authorized persons and/or animals.
- Access to the hazardous material storage area must be restricted to authorised personnel only and must be treated as a no-go zone to unauthorised personnel.
- Appropriate hazard signage indicating the nature of the stored materials must be prominently displayed at the storage area.
- Those persons tasked with handling any hazardous substances must be equipped with the knowledge, equipment, and safety gear necessary to handle the substance/s safely.
- Material Safety Data Sheets (MSDSs) must be available on site for all hazardous chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes
- Storage vessels of hazardous substances must be situated in an impermeable bunded area large enough to accommodate at least 110% of the capacity of the tank in question. If plastic sheeting is used to line the bunded area, care must be taken to ensure it is not punctured in any way during the course of the construction period.
- Fuel tanks must ideally be elevated so that leaks can easily be detected.
- No smoking may be permitted at or surrounding the area where fuels and hazardous substances are stored.
- Firefighting equipment must be located in close proximity to the storage area.

## **8.8 Cement and concrete batching**

Cement and concrete batching is permitted on site, but may only take place on designated impermeable, bunded surfaces, as agreed with the ECO.

- Cement/ concrete must not be mixed on bare ground.
- Cement/concrete must not be mixed within any drainage lines.
- The impermeable/ bunded area must be established in such a way that cement slurry, runoff and cement water will be contained and will not flow into the surrounding environment or contaminate the soil.
- Cement run-off and excess cement slurry must be collected in the designated impermeable area, allowed to dry and then disposed of at an appropriate facility. Alternately, the contaminated water can be collected in sealed tanks and transported to an appropriate disposal site for disposal.
- Empty cement bags are currently not recycled within the Garden Route and must be disposed of in the un-recyclables waste bins on site.

## **8.9 Erosion control and stormwater management**

Appropriate measures must be implemented to control the flow of storm water across the construction site, to prevent possible flooding, soil loss and dispersion of pollutants. All exposed earth surfaces must also be protected from wind and water erosion. Stripped areas must not remain uncovered for extended periods of time and must be provided with a suitable cover (vegetation, mulch, brush-packing) as soon as possible.

The scale and nature of the erosion and storm water control measures implemented on site must be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, storm water control) to the satisfaction of the ECO and consulting engineer.

It may be necessary to implement small-scale erosion protection measures at the construction site, to prevent soil erosion. Such measures may include the use of shade netting, geo-fabric, brush-packing, logs and stakes or similar barriers in areas susceptible to erosion and along exposed slopes. The netting/fabric is placed directly across the path of flow of storm water. Poles and logs, staked in along the contours of a slope susceptible to erosion may also be used.

## **8.10 Construction near a watercourse**

The site falls within the Primary Catchment K (Kromme) area and in quaternary catchment K10B. According to geospatial data sources, two non-perennial rivers are indicated to occur on the property. A non-perennial river is indicated to flow just west of the proposed development site, however, this non-perennial river was not observed during the site visit. Another other non-perennial river to the north and east of the proposed development

## **8.11 Excavations and Earthworks**

Any major earthworks with heavy machinery must be under constant supervision and operators are to be aware of all the environmental obligations, as there is always the potential to inflict damage to the sensitive areas. Any unnecessary or excessive heavy machinery movement must be kept to a minimum i.e., only what is absolutely necessary. Areas to be excavated must be clearly demarcated. It may be necessary to demarcate excavations or earthworks along busier haulage routes with orange barrier netting (or a similar product).

All excavated material must be stored on a flat surface away from any drainage line or area susceptible to erosion. The location must be decided upon in consultation with the ECO. Stored material must be protected from wind and water erosion, and this may entail covering the material with suitable shade

cloth material or similar (if and when necessary). The shade cloth may need to be weighed down by logs (or similar material) in such a manner that any stream flow is directed away from the stockpile, reducing the risk of erosion.

### **8.12 Site closure and rehabilitation**

Upon completion of the construction phase, all disturbed areas, including the working area (disturbance corridor), temporary access roads, and all areas utilised for the site camp and associated site camp facilities will require rehabilitation as follows:

- On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.
- All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped to improve filtration and reduce run-off.
- All demarcation fencing, including all droppers, wires, netting and barrier tape must be removed from site and taken to an appropriate site for re-use or disposal.
- Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the ECO. Any soil contaminated with oil, fuel or other hazardous substance must be collected and disposed of as hazardous waste.
- All construction waste, litter and rubble is to be removed from the site and disposed of at an appropriate facility. Burying or burning of waste or rubble on site is prohibited.
- Topsoil that was removed and stockpiled before construction, must be replaced by spreading it evenly over the areas from which it was removed. This topsoil (and the seedbank it contains) will facilitate the re-vegetation of the site.
- Disturbed areas, especially areas where excavations have taken place, must be shaped as appropriate (original topography must be restored where possible), and covered with a layer of stockpiled topsoil as soon as possible.
- Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and disposed of at an appropriate disposal site.
- The disturbed, newly rehabilitated surfaces (particularly steeper slopes and areas recently covered with topsoil) must be protected from wind & water erosion using mulch, brush packing or other appropriate erosion protection measures. Brush-packing/ mulching is done by covering the exposed surface with organic plant material such as branches, plant cuttings and leafy material. Ideally the vegetation removed from site at the start of the construction must be utilised. Brush-packing/ mulching plays a valuable role in erosion control, while also promoting re-vegetation of the site by retaining moisture in the soil, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) to promote new plant growth.
- Final rehabilitation of the site must be done to the satisfaction of the ECO, and must adhere to all conditions/ requirements of the Environmental Authorisation.
- If the site camp was located on the footprint of an erf or road, the location of the site camp must then be rehabilitated in accordance with the site development plan.

## 9. Environmental Impact Management Planning and design phase

No direct environmental impacts are associated with the planning and design phase. However, poor planning or inappropriate design decisions in this phase may result in environmental impacts arising during subsequent phases of the project.

Planning and design activities must therefore take into account the environmental constraints and opportunities identified during the Environmental Impact Assessment process, in order to avoid or minimise the potential future impacts of the development. Proper planning is also essential to ensure that adequate provision is made to implement the environmental requirements of this EMPr, and to ensure that the development remains compliant with the received Environmental Authorisation.

The environmental management objectives (goals) during this phase are to:

- Appoint an Environmental Control Officer.
- Environmental Control Officer to conduct an inspection prior to the commencement of construction activities on site

These environmental management outcomes, as well as the management actions that must be implemented in order to achieve the desired outcome and avoid/minimise potential impacts are discussed in more detail below.

### OBJECTIVE 1: APPOINTMENT OF AN ENVIRONMENTAL CONTROL OFFICER

| <b>Impact Management Objective: To appoint a suitably qualified and experienced Environmental Control Officer.</b>  |   |                     |  |
|---|---|---------------------|--|
| Potential impact to avoid   | Failure to appoint an ECO will result in non-compliance with the Environmental Authorisation and the requirements of the EMPr.  |                     |  |
| Impact Management Outcome   | The conditions of Environmental Authorisation and the requirements of the EMPr are implemented and monitored during all phases of the development, which will promote sound environmental management on site. |                     |  |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |   |                     |  |
| Mitigation measure  | Responsible party   | Time period         |  |
| <ul style="list-style-type: none"> <li>• A suitably qualified and experienced Environmental Control Officer must be appointed before any activities commence on site.</li> <li>• The appointed ECO must adhere to the requirements stated in Chapter 15 and 17 of the EMPr and any other requirements specified in the Environmental Authorisation.</li> <li>• The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training of construction workers.</li> </ul> | Mossel Bay Municipality   | During design phase |  |
| Performance Indicator   | A qualified ECO is appointed prior to the commencement of any construction activities (including pre-construction set-up activities) on site.   |                     |  |

**OBJECTIVE 2: UPDATE ENVIRONMENTAL MANAGEMENT PROGRAMME**

The Environmental Authorisation issued for the development may require certain amendments to be applied to the EMPr. In addition, the final site layout and detailed design may also necessitate the amendment of the EMPr, in order to ensure that the development is accommodated in the EMPr.

|   |  |                         |                     |
|---|--|-------------------------|---------------------|
| <b><i>Impact Management Objective: To ensure the EMPr adheres to the requirements of the Environmental Authorisation and makes provision for the final detailed site layout.</i></b>  |  |                         |                     |
| Potential impact to avoid   | <ul style="list-style-type: none"> <li>• Failure to update the EMPr in accordance with conditions specified in the EA may result in non-compliance with the EA.</li> <li>• Failure to update the EMPr to accommodate the final detailed site layout may result in non-compliance with the EA.</li> </ul> |                         |                     |
| Impact Management Outcome   | Good environmental management is promoted on site.   |                         |                     |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |  |                         |                     |
| Mitigation measure  |  | Responsible party       | Time period         |
| <ul style="list-style-type: none"> <li>• An independent Environmental Consultant must be appointed to amend the EMPr.</li> <li>• All amendments to the EMPr specified in the EA must be applied to the EMPr unless agreed otherwise in writing with the Competent Authority.</li> <li>• Amendments to the EMPr must be approved in writing by the Competent Authority.</li> <li>• Public participation may be required on the proposed EMPr amendments. The Competent Authority must be consulted for clarity on these requirements.</li> </ul> |  | Mossel Bay Municipality | During design phase |
| Performance Indicator   | An updated EMPr that adheres to the conditions of the EA and that reflects the requirements of the final detailed site layout is approved by the Competent Authority prior to commencing activities on site.   |                         |                     |



## 10. Environmental Impact Management Pre-Construction Phase

Proper set-up during the pre-construction phase can set the foundation for good environmental management during the active construction phase to follow and can avoid potential impacts from arising at a later date.

The Impact Management Objectives for this phase of the project relate to:

- Demarcation of no-go areas and working areas.
- Establishment of site camp and associated site facilities.
- Pre-construction ECO visit.

### OBJECTIVE 1: IDENTIFY & DEMARCATe NO-GO AND WORKING AREAS

| <b><i>Impact Management Objective: Identify and demarcate no-go areas, working areas and site facilities.</i></b>   |  |  |
|---|--|--|
| Potential impact to avoid   | <ul style="list-style-type: none"> <li>• Insensitive location of working areas and site facilities may result in environmental impacts during construction phase.</li> <li>• Failure to accurately demarcate working areas may result in increased disturbance footprint.</li> <li>• Failure to demarcate no-go (open spaces) areas may result in disturbance to these areas during construction.</li> </ul> |  |
| Impact Management Outcome   | Future construction activities will be restricted to within the designated areas & environmentally sensitive areas (no-go areas) will be protected from disturbance.   |  |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |  |  |
| Mitigation measure  | Responsible party  | Time period  |
| <ul style="list-style-type: none"> <li>• The no-go areas must be identified.</li> <li>• Demarcation of working area and no-go areas must be done in accordance with Section 8.2 of this EMPr.</li> <li>• Site camp facilities must be situated as far away from the No-Go areas as possible.</li> </ul> | Engineer / Contractor  | Pre-construction phase (prior to arrival of construction equipment, machinery, or workers on site) |
| Performance Indicator   | No-go areas, working areas and areas for site camp facilities have been identified and appropriately demarcated to the satisfaction of the ECO, before construction activities commence on site.   |  |

**OBJECTIVE 2: ESTABLISH ENVIRONMENTALLY SENSITIVE SITE CAMP & SITE FACILITIES**

|  |   |  |
|--|---|--|
| <b><i>Impact Management Objective: To set up and equip the site camp and associated site facilities in a manner that will promote good environmental management.</i></b>   |   |  |
| Potential impact to avoid  | <ul style="list-style-type: none"> <li>• Inappropriate siting of site camp facilities may result in impacts to sensitive resources (e.g. contaminated run-off from refuelling area may contaminate soil).</li> <li>• Failure to properly demarcate and set up site facilities may result in disorganised construction activities and unnecessary disturbance to the site.</li> <li>• Failure to provide the necessary site facilities and/or failure to equip these facilities with the necessary equipment/materials may impede good environmental management &amp; compromise ability to respond to emergencies.</li> </ul> |  |
| Impact Management Outcome  | Site camp facilities do not impact significantly on environment. The equipment required to implement the provisions of the EMPr are provided on site.   |  |
| <b>IMPACT MANAGEMENT ACTIONS</b>   |   |  |
| Mitigation measure   | Responsible party   | Time period  |
| <ul style="list-style-type: none"> <li>• The site camp and site facilities described in Section 8 of this EMPr must be provided on site.</li> <li>• The site camp and associated site facilities must be set-up and managed in accordance with the general environmental management measures specified in Section 8 of this EMPr.</li> </ul> | Contractor  | Pre-construction phase (prior to start of construction activities) |
| Performance Indicator  | Appropriate, well organised and properly equipped site facilities are available on site prior to commencement of construction activities. The location and set up of the facilities does not impact on the natural resources.   |  |

**OBJECTIVE 3: PRE-CONSTRUCTION ECO INSPECTION**

It is essential that the appointed ECO be advised of the intended construction start date before construction activities commence on site, so that the ECO can conduct an initial site inspection to assess the pre-commencement condition of the site. The ECO can also advise on the appropriate siting and demarcation of the site facilities, and the identification and demarcation of the no-go areas. The ECO may also conduct the first round of environmental awareness training at this stage, if the construction workers are present on site.

| <b><i>Impact Management Objective: Environmental Control Officer to conduct an inspection prior to the commencement of construction activities on site.</i></b>   |  |                             |
|---|--|-----------------------------|
| Potential impact to avoid   | <ul style="list-style-type: none"> <li>• Failure to appoint ECO or to notify ECO of commencement prior to commencement will result in non-compliance with the EA.</li> <li>• If a pre-commencement ECO inspection is not performed, the Applicant may be held liable for environmental degradation that took place prior to the Contractor commencing work on site.</li> </ul> |                             |
| Impact Management Outcome   | <ul style="list-style-type: none"> <li>• Good environmental management is promoted and enforced by the ECO during the full pre-construction and construction phases.</li> <li>• Site facilities are appropriately located on site.</li> <li>• Construction workers receive environmental awareness training before commencing work on site.</li> </ul>                         |                             |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |  |                             |
| Mitigation measure  | Responsible party  | Time period                 |
| <ul style="list-style-type: none"> <li>• The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training of construction workers.</li> </ul> | Contractor   | Start of construction phase |
| Performance Indicator   | A pre-commencement site inspection is conducted by the appointed ECO before construction activities commence on site.  |                             |

## 11. Environmental Impact Management Construction Phase

A number of potential environmental impacts may arise during the construction phase of the development. These impacts have been identified and assessed during the Environmental Impact Assessment process. Environmental Management outcomes and actions that will prevent the identified potential impacts from arising – or where avoidance is not possible, that will minimise and mitigate the impact – are provided in this section.

The environmental management actions and mitigation measures prescribed in this section must be implemented throughout the construction phase, and must be implemented in conjunction with the general management measures specified in Chapter 8 of this EMPr as well as any other conditions stated in the Environmental Authorisation. The Environmental Control Officer must monitor and enforce the implementation of the relevant environmental management measures and may provide guidance on the implementation of these environmental management measures as and when required.

### The environmental management objectives (goals) for the Construction phase are:

- Prevent erosion and
- limit noise, dust and other construction nuisances
- create employment opportunities

The environmental management actions that must be implemented in order to achieve the desired outcomes and avoid/minimise potential impacts are discussed in more detail in the sections below.

### OBJECTIVE 1: TO PREVENT EROSION

| <b><i>Impact Management Objective:</i></b>  |  |                    |
|---|--|--------------------|
| Potential impact to avoid   | <ul style="list-style-type: none"> <li>• No unnecessary noise should be allowed</li> </ul> |                    |
| Impact Management Outcome   | No avoidable noise impacts emanate from the site during the construction phase             |                    |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |  |                    |
| Mitigation measure  | Responsible party  | Time period        |
| <ul style="list-style-type: none"> <li>• Construction should only be allowed during normal construction working hours.</li> <li>• A register will be kept on site in order to report any complaints received.</li> <li>• No unnecessary noise disturbances should be allowed to emanate from the construction site (i.e., loud music).</li> </ul> | Contractor   | Construction phase |
| Performance Indicator   |  |                    |

**OBJECTIVE 2: TO LIMIT NOISE**

| <b><i>Impact Management Objective: To limit noise generated by construction activities</i></b>  |  |                    |  |
|---|--|--------------------|--|
| Potential impact to avoid   | <ul style="list-style-type: none"> <li>No unnecessary noise should be allowed</li> </ul> |                    |  |
| Impact Management Outcome   | No avoidable noise impacts emanate from the site during the construction phase           |                    |  |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |  |                    |  |
| Mitigation measure  | Responsible party  | Time period        |  |
| <ul style="list-style-type: none"> <li>Construction should only be allowed during normal construction working hours.</li> <li>A register will be kept on site in order to report any complaints received.</li> <li>No unnecessary noise disturbances should be allowed to emanate from the construction site (i.e., loud music).</li> </ul> | Contractor   | Construction phase |  |
| Performance Indicator   |  |                    |  |

**OBJECTIVE 3: JOB CREATION**

| <b><i>Impact Management Objective: To create employment opportunities with potential for skills transfer, for members of the local community.</i></b>   |  |                    |  |
|---|--|--------------------|--|
| Potential impact to be promoted   | <ul style="list-style-type: none"> <li>Temporary jobs opportunities</li> <li>There may be opportunities to transfer skills from more experienced workers to less experienced workers.</li> </ul>                                 |                    |  |
| Impact Management Outcome   | The local community benefits from the employment opportunities created during the construction phase.  |                    |  |
| <b>IMPACT MANAGEMENT ACTIONS</b>  |  |                    |  |
| Mitigation measure  | Responsible party  | Time period        |  |
| <ul style="list-style-type: none"> <li>No mitigation required for this positive benefit. However, where practical preference must be given to previously disadvantaged individuals from the local community when appointing contractors/ workers.</li> <li>Skills transfer between members of the workforce should be encouraged</li> </ul> | Contractor   | Construction phase |  |
| Performance Indicator   | The majority of the construction team is from the local community, with preference given to historically disadvantaged individuals. Skills transfer from experienced to less experienced workers is actively encouraged on site. |                    |  |

## 12. Environmental impact management post construction rehabilitation phase

After all construction activities have ceased, the sites must be cleared of all construction related equipment, materials, facilities and waste. In addition all disturbed surfaces – including disturbed areas around the structures and all areas utilised for site facilities – must be stabilised, rehabilitated and provided with a suitable cover. All temporary access roads constructed must be rehabilitated and access must be restricted from the public.

### The environmental management objective (goal) for this phase is to:

- rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner
- prevent the discharge of wastewater into the Garden Route Dam
- prevent contamination of surface water

### OBJECTIVE 1: SITE CLOSURE & REHABILITATION

| <b>Impact Management Objective: To rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner.</b>   |   |                         |
|--|---|-------------------------|
| Potential impact to avoid  | <ul style="list-style-type: none"> <li>• Failure to remove all construction related waste and materials may result in environmental pollution.</li> <li>• Failure to remove all construction related equipment, machinery and site facilities may pose an impact to the natural environment.</li> <li>• Failure to stabilise disturbed surfaces may result in soil erosion and increased storm water run-off, which may limit successful revegetation of the site.</li> </ul> |                         |
| Impact Management Outcome  | <ul style="list-style-type: none"> <li>• The site is neat and tidy, and all exposed surfaces are suitably covered/ stabilised.</li> <li>• There is no construction-related waste or pollution remaining on site.</li> </ul>   |                         |
| <b>IMPACT MANAGEMENT ACTIONS</b>   |   |                         |
| Mitigation measure   | Responsible party   | Time period             |
| <ul style="list-style-type: none"> <li>• On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.</li> <li>• Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the ECO.</li> <li>• Any contaminated soil must be collected and disposed of as hazardous waste.</li> <li>• All construction waste, litter and rubble are to be removed from the site and re-used elsewhere or recycled/disposed of at an appropriate facility.</li> <li>• Burying or burning of waste or rubble on site is prohibited.</li> <li>• All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped.</li> </ul> | Contractor  | Post-Construction phase |

|  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Topsoil removed during the establishment of the site camp and the working area must be spread evenly over the entire site camp area and all other disturbed/ exposed areas after those areas have been ripped, scarified, shaped and contoured (as required).</li> <li>• Where necessary seeding and planting of vegetation can take place after the replacement of the topsoil. Hardy, drought tolerant, non-invasive plant species must be selected. If needed, a layer of mulch can be applied to the newly shaped/ landscaped and topsoiled areas. The mulch will serve to limit erosion and will promote the re-vegetation of the site by retaining moisture in the soil and providing organic material (compost) for new plant growth. Mulched material must be spread to a depth of ± 50mm – a thinner layer is likely to be ineffective in protecting the site, while thicker layers may suppress plant growth.</li> <li>• All exposed soils and recently topsoiled areas are to be re-vegetated or stabilised to the satisfaction of the ECO, to protect these areas from wind and water erosion. No areas are to be left exposed to erosive forces. Erosion protection measures that can be applied include mulching (described above), the placement of geotextile, onion bags filled with wood chips, brush-packing or other similar measures.</li> <li>• Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and reused elsewhere on the property or disposed of at an appropriate disposal site.</li> <li>• Where necessary disturbed soils must be revegetated with the local indigenous vegetation such as that which occurs at the site or provided with other suitable cover.</li> <li>• It is recommended that follow-up alien clearing be conducted 6 months after construction is complete.</li> </ul> |   |  |
| <p>Performance Indicator</p>   | <ul style="list-style-type: none"> <li>• All construction-related materials, equipment, facilities, waste and contaminated soils have been removed from the site.</li> <li>• Compacted soils have been scarified/ ripped and stabilised.</li> <li>• All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised.</li> <li>• No alien vegetation is evident on site.</li> </ul> |  |

## **13. Emergency Preparedness**

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### **13.1 Emergency response procedures**

The potential environmental risks that may arise as a result of construction activities must be identified, and appropriate emergency response procedures must be compiled for each emergency scenario. Potential environmental emergencies that require an emergency response include – but are not limited to – unplanned fires, sewage spills, spills of hazardous chemicals, snake bites etc.

- The construction contractor is responsible for ensuring that the requirements of the Occupational Health & Safety Act (OHSA) are adhered to during the construction phase. The Applicant is responsible for ensuring compliance with the OHSA during the undertaking of construction activities.

### **13.2 Emergency preparedness**

The following measures must be implemented, as appropriate, to ensure effective responses to emergencies:

- All workers on site during the construction and maintenance phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training and advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on site during construction activities (see section 8.3).
- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g., hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed. A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.

### **13.3 Control of emergency incidents**

In the event of an emergency incident, Section 30 of the National Environmental Management Act, 1998, must be complied with.



**Any incidents must be reported to the relevant authorities and within the prescribed period.**

**Table 3: NEMA Section 30**

30.(1) in this section

(a) "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment. Whether immediate or delayed.

(b) "responsible person" includes any person who

(i) is responsible for the incident

(ii) owns any hazardous substance involved in the incident; or

(iii) was in control of any hazardous substance involved in the incident at the time of the incident

(c) "relevant authority" means

(i) a municipality with jurisdiction over the area in which an incident occurs

(ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs:

(iii) the Director-General

(iv) any other Director-General of a national department

(2) Where this section authorises a relevant authority to take any steps, such steps may only be taken by

(a) the person referred to in subsection (1)(c)(iv) if no steps have been taken by any of the other persons listed in subsection (1)(c):

(b) the person referred to in subsection (1)(c)(iii) if no steps have been taken by 20 any of the persons listed in subsection (1)(c)(i) and (c)(ii):

(c) the person referred to in subsection (1)(c)(ii) if no steps have been taken by the person listed in subsection (1)(c)(i):

Provided that any relevant authority may nevertheless take such steps if it is necessary to do so in the circumstances and no other person referred to in subsection (1)(c) has yet taken such steps.

(3) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available.

(a) the nature of the incident

(b) any risks posed by the incident to public health, safety and property

(c) the toxicity of substances or by-products released by the incident; and

(d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to

(i) the Director-General

(ii) the South African Police Services and the relevant fire prevention service:

(iii) the relevant provincial head of department or municipality; and

(iv) all persons whose health may be affected by the incident

(4) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident

(a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;

(b) undertake clean-up procedures:

(c) remedy the effects of the incident:

(d) assess the immediate and long-term effects of the incident on the environment and public health:

(5) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director-General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including

(a) the nature of the incident

(b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;

(c) initial measures taken to minimise impacts:

(d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and

(e) measures taken and to be taken to avoid a recurrence of such incident.

(6) relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following:

(a) the principles set out in section 2

(b) the severity of any impact on the environment as a result of the incident and the costs of the measures being considered;

(c) any measures already taken or proposed by the person on whom measures are to be imposed, if applicable:

(d) the desirability of the state fulfilling its role as custodian holding the environment in public trust for the people

(e) any other relevant factors.

(7) A verbal directive must be confirmed in writing at the earliest opportunity. Which must be within seven days.

(8) Should

(a) the responsible person fail to comply, or inadequately comply with a directive under subsection (6):

(b) there be uncertainty as to who the responsible person is: or

(c) there be an immediate risk of serious danger to the public or potentially serious detriment to the environment

A relevant authority may take the measures it considers necessary to

(i) contain and minimise the effects of the incident:

(ii) undertake clean-up procedures: and

(iii) remedy the effects of the incident.

(9) A relevant authority may claim reimbursement of all reasonable costs incurred by it in terms of subsection (8) from every responsible person jointly and severally.

(10) A relevant authority which has taken steps under subsections (6) or (8) must, as soon as reasonably practicable, prepare comprehensive reports on the incident. Which reports must be made available through the most effective means reasonably available to

(a) the public:

(b) the Director-General

(c) the South African Police Services and the relevant fire prevention service;

(d) the relevant provincial head of department or municipality; and

(e) all persons who may be affected by the incident.

(11) A person who contravenes or fails to comply with subsection (3), (4), (5) or (6) is guilty of an offence and liable on conviction to a fine not exceeding R1 million or to imprisonment for a period not exceeding 1 year, or to both such a fine and such imprisonment.

## 14. Method statements

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The Competent Authority and/or the ECO may require the Applicant or Construction Contractor to submit Method Statements for one or more construction-related activity, or any aspect of the management of the site, before the activity is undertaken or during the performance of the activity if the activity is causing or may cause significant environmental damage or pose a health and safety risk.

Method Statements need not be complex and lengthy, but must clearly state **how**, **when** and **where** the activity concerned will be undertaken, and must specify **who** will be responsible for undertaking each component of that activity. Method Statements must be prepared by the Construction Contractor and submitted to the ECO for approval before undertaking the activity concerned.

The ECO and / or Competent Authority have the authority to request method statements for other activities, including but not limited to:

- Establishment of site camp and stockpile area.
- Cement/ concrete batching, disposal and emergency contingencies.
- Topsoil and sub-soil storage/ stockpiling.
- Storage of fuels and hazardous chemicals and emergency contingencies.
- Waste management system.
- Storm water management and control.
- Emergency preparedness plan / emergency response procedure (see Chapter 13).

The ECO has the authority to prevent activities from being undertaken until such time as a satisfactory Method Statement has been submitted to the ECO and approved by the ECO.

## 15. Roles and Responsibilities

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This EMPr, once approved by the competent authority (DEADP), should be seen as binding to the Applicant, and any person acting on the Applicant's behalf, including but not limited to agents, employees, associates, contractors and service providers.

The Applicant and all other persons who may be directly involved in the development are also bound by their general Duty of Care, as stated in Section 28 of the National Environmental Management Act, 1998:

### **Duty of Care:**

*“Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment”*

### **15.1 Duties and Responsibilities of the Applicant**

The Applicant is ultimately responsible for ensuring that the environmental management measures specified in this EMPr, as well as any other conditions specified by the competent authority, are implemented and adhered to during the construction phase of the proposed development.

The Applicant or party delegated by the applicant is responsible for monitoring during the construction phase. The Applicant must ensure that all appointed service providers, contractors and workers are capable of complying with all statutory requirements of this EMPr and the conditions of the Environmental Authorisation. The Applicant is responsible for ensuring that this EMPr and the conditions of the Environmental Authorisation are implemented and adhered to during construction activities undertaken by the Applicant.

The Applicant or appointed consultant is responsible for identifying emergency situations that may arise during operational activities undertaken by the Applicant and must formulate appropriate emergency response procedures for these emergency scenarios.

### **15.2 Duties and Responsibilities of the Contractor**

The "Construction Contractor" is the entity responsible for undertaking the physical construction of the residential development. The construction contractor is responsible for ensuring that all environmental management measures specified in this EMPr and in the EA are implemented during the pre-construction, construction and post-construction rehabilitation phases, unless agreed otherwise with the Applicant. The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring effective environmental management during construction. The contractor must therefore make adequate financial provision for the implementation of all prescribed measures.

It is strongly recommended that the Construction Contractor appoint an Environmental Site Officer (ESO), who will act as the Contractor's representative to monitor and enforce compliance with the conditions of this EMPr, throughout all phases of construction.

In addition to the above, the Construction Contractor is responsible for the following:

- Identify emergency situations that may arise as a result of construction activities and formulate appropriate emergency response procedures (see Chapter 13).
- Ensure that all construction workers, including sub-consultants and service providers, undergo environmental awareness training prior to commencing work on site, or as soon as possible thereafter (see Chapter 16).
- Compile the required method statements, which must be to the satisfaction of the ECO, before commencing with the activity to be governed by the method statement (Chapter 14).
- Respond to concerns or issues identified by the ECO, as relates to environmental management, and implement the appropriate management or remediation measures, at the Contractor's own expense (unless agreed otherwise)
- Should third parties be called to the site to perform clean up and rehabilitation procedures, the Construction Contractor will be responsible for all associated costs.

Note that failure to comply with the requirements and conditions of this EMPr and the Environmental Authorisation may result in fines or other penalties being levied against the Construction Contractor by the Competent Authority.

### 15.3 Duties and Responsibilities of the ECO

The appointed Environmental Control Officer (ECO) is responsible for undertaking regular site visits to monitor and report on the implementation of the EMPr and adherence to the conditions of the Environmental Authorisation during the pre-construction, construction and post-construction rehabilitation phases. The ECO is not required to monitor the site during the operational phase of the development.

#### Competency of the ECO

The ECO must be independent of the Applicant, Engineer, Construction Contractor and their service providers. The appointed ECO must be suitably qualified and experienced, and must be able to demonstrate that he / she is of sufficient competency to undertake the required task. The ECO should preferably be a resident in close proximity to the development area to ensure quick response if required. The ECO must work in close co-operation with the Construction Contractor, resident engineer or ESO (where applicable) and all contractors in order to identify potential problems before they occur, and provide suitable guidance as to how the identified problems (environmental impacts) can be avoided.

#### Duties of the ECO

The duties of the ECO include, but are not limited to:

- Conduct a pre-construction site inspection to ascertain the pre-commencement condition of the site (i.e. the status quo) and determine whether faunal search-and-rescue is required;
- Conduct environmental awareness training (see Chapter 16);
- Undertake regular site visits to monitor compliance with all mitigation, monitoring and management measures contained in the EMPr and the Environmental Authorisation, during the pre-construction, construction and rehabilitation phases of the development (see section below regarding frequency of ECO visits).
- Evaluate the achievement of the performance indicators associated with each impact management outcome specified in this EMPr (Chapters 9-12)
- Liaise with site contractors, engineers and other members of the development team with regard to the requirements of the EMPr;
- Provide guidance as and when required regarding the implementation of the environmental management measures contained in the EMPr and EA, so as to assist the Applicant and contractor in remaining compliant with these measures;
- Assist in finding environmentally acceptable solutions to construction problems;
- Ensure that the working area, site camp facilities, access roads and no-go areas are properly demarcated;
- Ensure that proper topsoil management practices are adhered to on site;
- Ensure that proper waste management & pollution prevention strategies are practised on site;
- Examine method statements;
- Email contractors with potential non compliance notices in case of contravention of the EMPr;
- Ensure satisfactory rehabilitation of disturbed areas on site, after construction is complete;
- Keep detailed records of all site activities that may pertain to the environment, and produce compliance-monitoring reports (ECO Reports) for submission to the Applicant, and the Competent Authority at regular intervals during the construction phase;
- Submit a final post-construction inspection report, within 6 months of completion of the construction phase. The audit report must detail the rehabilitation measures undertaken,

describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

- All ECO Reports and Inspection Reports must be submitted to the Applicant and Competent Authority.

### **Frequency of ECO visits**

The ECO must conduct weekly site visits during the initial bulk earthworks (civils), to check compliance with the conditions of the EA and mitigation measures and recommendations of this EMPr. Once the Civils construction has been completed and construction activities shift to the internal mechanical components of the facility, the ECO can then reduce the weekly visits to a frequency of twice a month (fortnightly). The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

The ECO must also undertake a final inspection (audit) 6 months of completion of construction activities. The purpose of this final inspection is to ensure that the rehabilitation measures applied at the conclusion of the construction phase have been sufficient to promote the successful rehabilitation of the site, and to identify any further issues that require attention or follow-up.

### **Authority of the ECO**

The ECO has the authority to recommend that the Engineer suspend all works (or part thereof) occurring on site, should any action being undertaken on site not comply with the environmental requirements, and where such actions pose a serious threat to any element of the surrounding environment.

The ECO has the authority to recommend measures to the Engineer, regarding measures that must be implemented on site in order to ensure compliance with the EMPr and Environmental Authorisation, and/or to prevent environmental degradation or pollution from occurring.

The ECO has the authority to issue verbal and written warnings to contractors. Should verbal and written instructions and/or warnings be ignored, the ECO has the authority to request the Engineer to issue pre-determined fines or other penalties.

## **16. Environmental Awareness Plan**

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Environmental Awareness Training must be conducted prior to the commencement of construction activities. It is the applicant's responsibility to familiarise himself/herself with the content and requirements of this EMPr. The applicant is also responsible to ensure that the contractor and all labourers working on site during the construction phase are familiar with the content of this EMPr.

The following actions must be taken to ensure that all relevant parties are aware of their environmental role and duties:

1. This EMPr must be kept on site at all times.
2. The provisions of this EMPr and the conditions of the Environmental Authorisation must be explained in detail to all staff during Awareness Training.
3. Training booklets will be handed out to all labourers and must be explained to them.
4. Weekly checks to be done by the Applicant's environmental representative (where available) who must be on site at all times.
5. The ECO to do frequent site visits, as recommended in Section 15.3 of the EMPr.
6. Monthly monitoring reports to be compiled by the ECO. These reports will be circulated to all parties involved (including the applicant, contractor and the competent authority).

The Construction Contractor must make allowance for all construction site staff, including all subcontractors that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing any work on site. During this training, the ECO will explain the EMPr and the conditions contained therein. Attention will be given to the construction process and how the EMPr fits into this process. Other items relating to sound environmental management which must be discussed and explained during the environmental awareness training sessions include:

- The demarcated "No-Go" areas;
- General do's and don'ts of the site;
- Making of fires;
- Waste management, use of waste receptacles and littering;
- Use of the toilets provided;
- Use and control of construction materials and equipment etc.;
- Control, maintenance and refuelling of vehicles;
- Methods for cleaning up any spillage;
- Access and road safety;
- Emergency procedures (e.g. in case of fire, spillage etc.)
- General "best practice" principles, with regards to the protection of environmental resources.

Environmental awareness training and education must be ongoing throughout the construction phase and must be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMPr), or as new workers come to site. Translators must be utilised where needed. An Environmental Awareness Guideline has been compiled and is included in Appendix F of the EMPr.

## **17. Monitoring, Record Keeping and Reporting**

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### **17.1 Environmental Auditing**

In accordance with the requirements of the Amended Environmental Impact Assessment Regulations of 2014 (GN No. R.327 of 7 April 2017), the holder of the Environmental Authorisation (i.e. the Applicant) must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The appointed auditor must undertake environmental audits within 6 months after the completion of the rehabilitation measures. Following each audit the environmental auditor must submit an audit report to the Competent Authority (in this instance the DEA&DP). The Auditor must be independent from the EAP and ECO.

- Environmental auditing and environmental audit reports must adhere to the requirements of the Environmental Impact Assessment Regulations, in particular Section 34 (*Auditing of Compliance with Environmental Authorisation, Environmental Management Programme*) and Appendix 7 (*Objective and Content of Environmental Audit Report*).
- The audit report must provide verifiable findings on the level of compliance with the provisions/ conditions of the Environmental Authorisation and the EMPr, and must also comment on the ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.
- Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations

as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

### **17.2 Construction phase monitoring, reporting and record keeping.**

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals during the construction phase, in order to ensure that the provisions of this EMPr and the Environmental Authorisation are adhered to and that sound environmental management is ensuing on site.

The ECO must compile a monthly ECO report detailing the ECO's observations on site, any instances of non-compliance and any issues or aspects that require attention, follow-up or remedial action. The ECO reports must be submitted to the Applicant, and to the Competent Authority as requested by the DEADP in the EA. The ECO inspection reports must include both photographic and written records.

#### **ECO Inspections - Photographic Records**

The condition of the surrounding natural environment must be monitored regularly in order to ensure that construction and management activities are not impacting negatively on the condition of the landscape and any sensitive ecosystems. The most effective way to achieve this is by means of a detailed photographic record. In this way, a record of any shift in ecosystem condition can be maintained and potential impacts be detected at an early stage. It is thus recommended that fixed-point photo-monitoring sites could be set up, and photographs should be taken at these sites during each ECO inspection. Where necessary, the entire working area should be well documented and photographed.

#### **ECO Inspections - Written Records**

The following record-keeping during the pre-construction, construction and rehabilitation phases of the development is recommended:

- The ECO should complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Applicant, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The monthly reports must be a summary of the ECO inspections from the preceding month and must highlight the key concerns/ issues on site, instances of non-compliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.
- All ECO reports and ECO instructions must be retained on file by the Applicant at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority should request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations should be clearly documented and filed on a master file off-site for safe keeping.
- It is recommended that a site register (incident register) should be kept on site at the site office for the recording of any environmental incidents (e.g., fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents should also be recorded.
- A complaints register should be kept on site in which complaints by any member of the public should be logged.



- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report should detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

### **Construction Phase Record Keeping**

A copy of the approved EMPr, the Environmental Authorisation and any relevant construction method statements must be kept on site at all times during pre-construction, construction and rehabilitation activities. The ECO Reports must be retained by the Applicant for a period of at least 5 years and must be provided to the Competent Authority upon request. Additionally any groundwater or water quality results must be made available to all relevant authorities upon request.

### **17.3 Corrective Action Procedure**

Correction actions need to be followed in the event where there is non-compliance with a condition of the EA and any recommendation and mitigation measure as stipulated in this EMPr in order to rectify the non-compliance and to prevent reoccurrence.

The ECO will be responsible for reporting non-compliance with any condition of the EA and the recommendations and mitigation measures as included in this EMPr. The ECO will also be responsible for the compilation of non-compliance reports and identifying steps to correct the non-compliance.

The ECO must report all non-compliance issues to the contractor whose responsibility it is to correct. A timeframe for the completion of the corrective actions must be agreed to the ECO. Once the corrective actions have implemented the contractor must notify the ECO. The ECO must review the effectiveness of the corrective actions and if it is found to be inadequate, additional measures must be implemented. Only once the corrective actions have been completed to the satisfaction of the ECO will the matter be considered as closed.

In instances where there are repeated instances where the requirements and conditions of this EMPr and the Environmental Authorisation are contravened or not fully complied with, the Construction Contractor may be liable for financial penalties. Penalties shall be issued by the Engineer, in accordance with the Schedule of Fines contained in the table below. Penalties may be issued at the Engineer's discretion, and/or upon the request/ recommendation of the ECO or Competent Authority.

Depending on the nature of transgression, the Engineer and/or ECO may issue one or more warnings to the Contractor prior to the issuing of a fine. Warnings may be given in writing or orally, but oral warnings must be followed up with written confirmation of the warning within 48 hours of the oral warning. The Engineer has the discretion to issue a fine without first issuing a warning, if the severity of the transgression is judged by the Engineer and/or ECO and/or Competent Authority to warrant such action.

The Engineer must ensure that the levying of fines/penalties forms part of the contract between the Construction Contractor and the Engineer and is subject to the provisions of South African contract law.

The table below specifies the transgressions for which the Construction Contractor may incur financial penalties, and the amount of the fines that may be levied. Levying of fines/ penalties is subject to alignment with South African Contractual Law. For repeat offences of the same/ similar transgression by the same party, the value of the fine shall be doubled for each subsequent repeat offence to a maximum value of **R50 000.00** per offence.

*Note: "Provisions", as stated in the table below, relates to the requirements specified in this EMPr and any requirements or conditions specified in the EA, as well as any other requirements governing the environmental management aspects of the development, which the Contractor is responsible for implementing.*

Environmental Management Programme

| #  | Finable Transgression  | Min Fine | Max Fine |
|----|--|----------|----------|
| 1  | Failure to notify the ECO of the commencement of construction or pre-construction activities, prior to the commencement of such activities   | R1 000   | R2 000   |
| 2  | Failure to comply with the provisions relating to the demarcation of the working area, site camp and associated facilities, and the maintenance of the demarcated boundaries.  | R1 000   | R5 000   |
| 3  | Failure to comply with the provisions relating to the demarcation of all "no-go" areas, and the maintenance of the demarcated boundaries.  | R2 000   | R5 000   |
| 4  | Failure to provide secured ablution facilities (1:30 ratio) on site.   | R500     | R15 000  |
| 5  | Failure to comply with the provisions relating to the clearance of vegetation on site.   | R2 000   | R5 000   |
| 6  | Clearance of indigenous vegetation (regardless of the density of alien vegetation present) outside of the demarcated boundaries of the working area and site camp.   | R2 500   | R15 000  |
| 7  | Damage to indigenous vegetation in the surrounding areas within No-Go areas  | R2 000   | R10 000  |
| 8  | Failure to apply herbicide to alien vegetation when required to do so.   | R500     | R2 000   |
| 9  | Failure to adhere to designated access routes and/or the driving of vehicles through undeveloped vegetation outside of the demarcated working area or site camp.   | R1 000   | R5 000   |
| 10 | Movement of vehicles and/or construction workers in no-go areas;   | R1 000   | R10 000  |
| 11 | Empty cement bags found on site or surrounding vegetation. Open cement bags on site with cement blowing from the bag   | R2 500   | R15 000  |
| 12 | Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, within designated "no-go" areas.  | R1 000   | R10 000  |
| 13 | Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, outside of the areas demarcated for such parking/storage.   | R500     | R5 000   |
| 14 | Failure to comply with the provisions relating to the management of topsoil and subsoil.   | R1 000   | R5 000   |
| 15 | Excessive excavation of material in areas not depicted for such purpose / activity on the approved design plans.   | R2 500   | R10 000  |
| 16 | Failure to comply with the provisions relating to waste management on site i.e. recycling of waste   | R500     | R5 000   |
| 17 | Failure to comply with the provisions relating to the storage, use and management of hazardous substances and fuels on site and/or the spillage of hydrocarbons or hazardous substances on site.   | R1 000   | R10 000  |
| 18 | Mixing cement or concrete on bare ground and/or failure to comply with any other provision regarding cement/ concrete batching   | R1 000   | R5 000   |
| 19 | Failure to provide adequate fire-fighting equipment (in working order) on site at all times and/or failure to comply with the provisions relating to fire prevention and/or the occurrence of unattended or out of control fires.  | R500     | R5 000   |
| 20 | Refuelling of vehicles, machinery or equipment outside of the designated refuelling area.  | R500     | R2 000   |
| 21 | Maintenance of vehicles, machinery or equipment outside of the designated maintenance yard, except in emergencies  | R500     | R2 000   |
| 22 | Failure to undertake refuelling or repairs over a drip tray or other impermeable bunded surface to collect spilled hydrocarbons (fuels, lubricants, oils etc.) and other hazardous substances; failure to provide drip trays under fuel burning equipment (including pumps and generators) where there is a risk of hydrocarbon leakage. | R500     | R2 000   |

|    |  |        |         |
|----|--|--------|---------|
| 23 | Storing / placing fuel containing equipment (i.e. bowsers and other fuel containers) within a drainage line.   | R2 500 | R10 000 |
| 24 | Failure to produce a required method statement/s to the engineer's and ECO's satisfaction prior to undertaking the activity concerned and/or failure to adhere to an approved method statement | R1 000 | R5 000  |
| 25 | Waste found to be buried or burnt on site  | R5 000 | R15 000 |

## 18. CONCLUSION

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The recommendations and mitigation measures prescribed in this EMPr have been formulated with the intention of addressing potential pre-construction, construction and operational phase impacts on the environment. It is likely that if the conditions, requirements and recommendations of the above EMPr are implemented as described and the relevant stakeholders adhere to the various mitigation measures, then the project will be completed without unforeseen negative environmental impacts. Familiarity with the contents of this EMPr by the contractors and other individuals involved in the development project will assist in achieving "environmental best-practice", which ultimately ensures that the project arrives at a sustainable outcome.