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# DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR THE

## THE PROPOSED UPGRADE OF THE SCHAAPKOP SEWER RISING MAIN ON REMAINDER OF ERF 464 AND ERF 13486, GEORGE, 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:** George Municipality  
Water & Sanitation: Civil Engineering  
Services  
PO Box 19  
George  
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**DATE:** 17 January 2024

**DEADP REF NO:** 16/3/3/1/D2/19/0003/24  
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- 
- Environmental Impact Assessments • Basic Assessments • Environmental Management Planning
  - Environmental Control & Monitoring • Water Use License Applications • Aquatic Assessments



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- Appendix E:** Environmental Awareness Guideline

**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— (a) details of— (i) the EAP who prepared the EMPr; and (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— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management : Construction Phase 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 — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 9 - Environmental Impact Management: Planning and Design Phase Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management: Construction Phase 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 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 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 Section 10 - Environmental Impact Management: Pre-construction Phase Section 11 - Environmental Impact Management: Construction Phase Section 12 - Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase 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 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— (i)the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii)risks must be dealt with in order to avoid pollution or the degradation of the environment; and	<p>Section 15 - Roles and Responsibilities</p>
(n)any specific information that may be required by the competent authority.	tbd

## DOCUMENT DETAILS

<b>Project Ref. No:</b>	11/EMPR/SKPS/GM/WC/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**):

Michael studied at the University of Cape Town completing a Bachelor of Science degree majoring in Environmental and Geographic Science and Ocean and Atmospheric Science. Michael joined SES in 2014 and has extensive experience in assessments and monitoring and has worked on a variety of technical projects. See Appendix G for his curriculum vitae. Michael is registered with EAPASA as a certified Environmental Practitioner (EAPASA # 2021/3163).

#### CARLA SWANEPOEL (**Candidate Environmental Practitioner, Co-Writer**)

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 George Municipality: Water & Sanitation: Civil Engineering Services*, to complete the Environmental Management Programme (EMPr) as part of the Basic Assessment Process for the proposed upgrade of the Schaapkop sewer rising main on Reminders of Erven 464 and 13486, George, Western Cape Province.

The proposed upgrade 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 George Municipality: Water & Sanitation: Civil Engineering Services* (as the Implementing Agent) and any person/s acting on behalf of *George Municipality: Water & Sanitation: Civil Engineering Services*, 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 *George Municipality: Water & Sanitation: Civil Engineering Services*, 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 *George Municipality: Water & Sanitation: Civil Engineering Services* 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 *George Municipality: Water & Sanitation: Civil Engineering Services*, 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. *George Municipality: Water & Sanitation: Civil Engineering Services* 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**

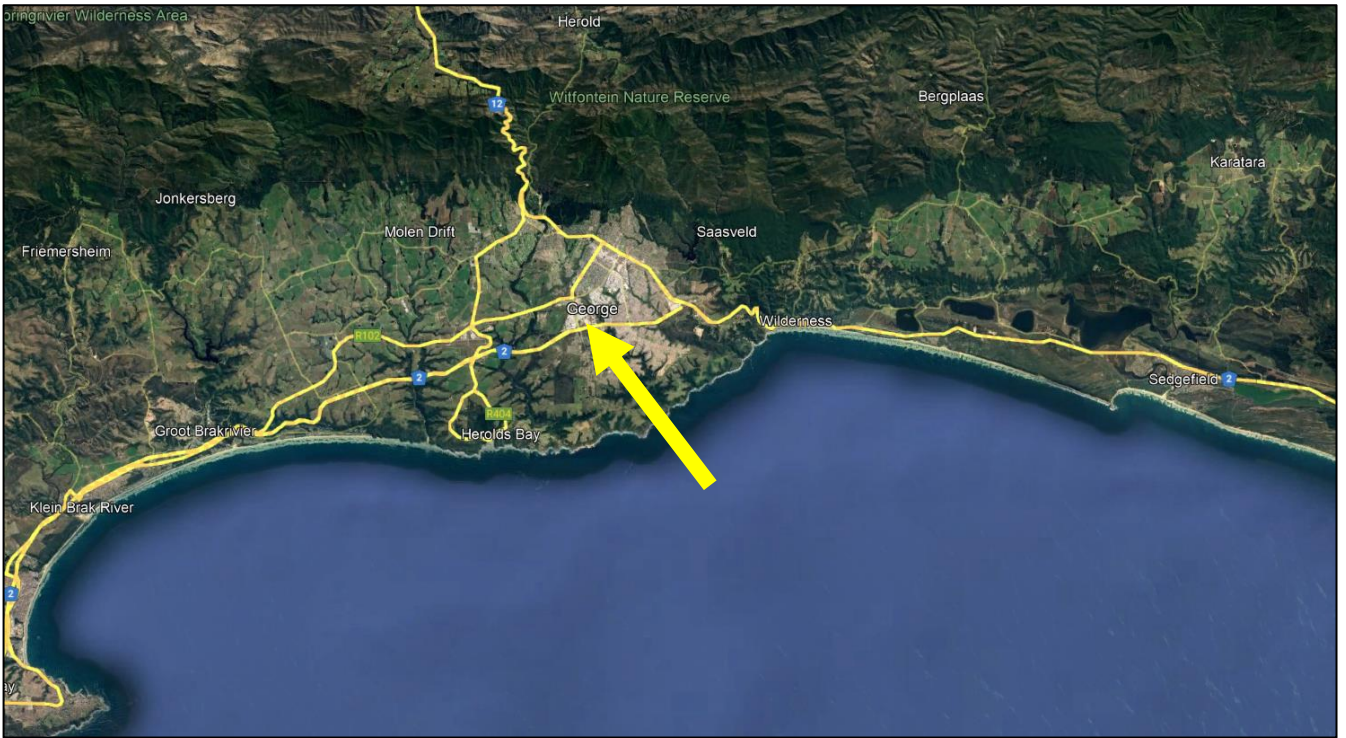
Schaapkop Pump Station was constructed in 1986 and generally operates with vintage equipment from that era. The equipment is therefore more than 30 years old, far exceeding the expected design life of mechanical and electrical equipment. In addition, the pump station is faced with a capacity shortfall. The pump station is experiencing frequent and costly breakdowns, threatening the integrity of the sewage system. Therefore, the upgrade of the pump station and rising main is required.

The rising main from Schaapkop Pump Station to the Outeniqua Wastewater Treatment Works consists of various sections of pipe. Most of the pipeline consist of an asbestos cement pipe with constant inside nominal diameter of 800 mm. A short section of pipe is made of asbestos cement pipe with constant inside nominal diameter of 500 mm, as well as steel pipe over a bridge (river crossing). The pipe bridge also serves as a crossing for the rising main from the Tamsui pumps station to the Schaapkop Pump Station.

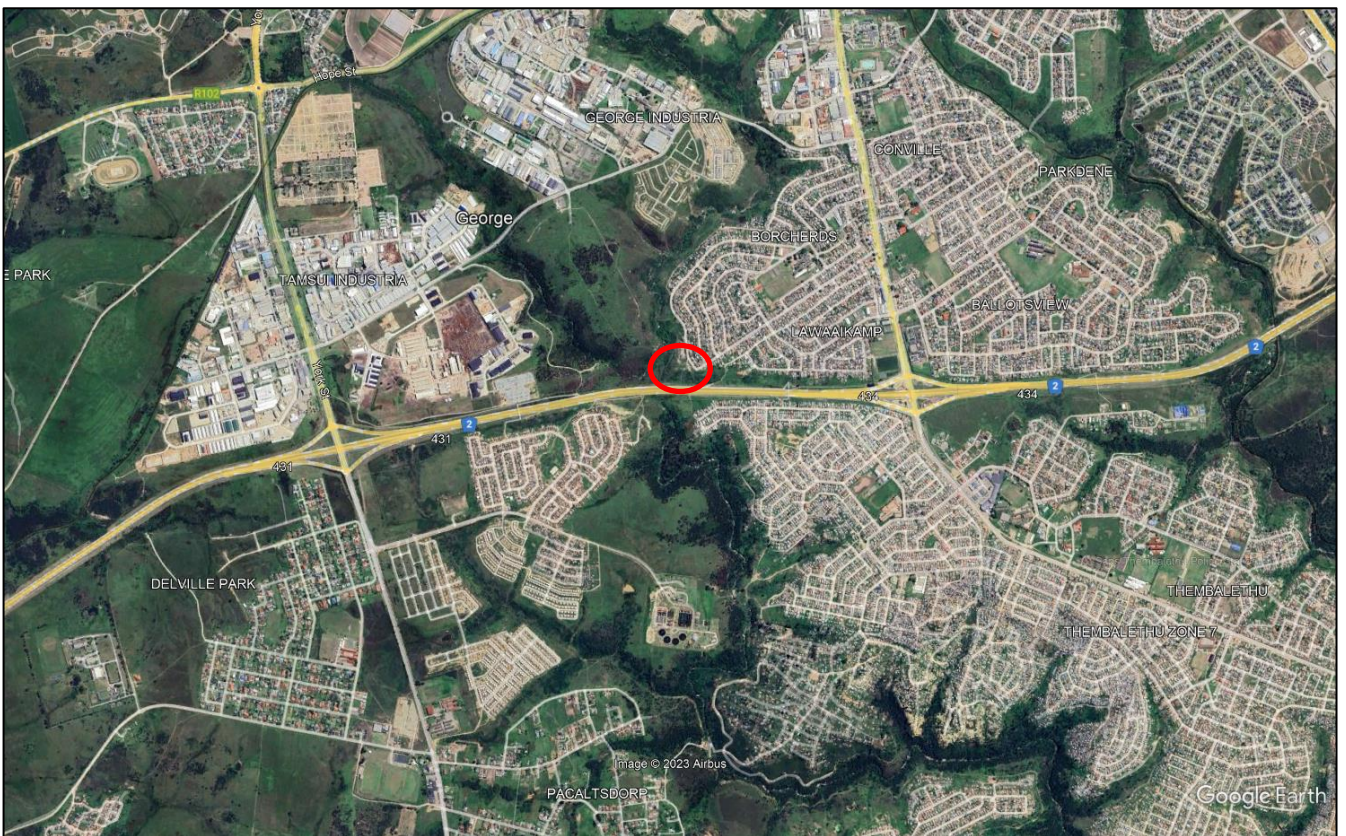
As part of the upgrade of the of Pump Station, the existing portion of 500 mm diameter rising main will be upgraded to an 800 mm diameter rising main.

The first ±147 m of the existing rising main is of 500 mm diameter and includes a pipe bridge section. Record drawings indicate a 600 mm diameter end cap which is connected to the existing rising main with 800 mm × 600 mm steel tee. It is proposed that the new 800 mm diameter rising main be connected to the existing 800 mm diameter rising main using this existing end cap. The exact position and depth, as well as the condition of the end cap and tee piece will have to be confirmed during the Design Development Stage.





**Figure 1: Approximate Locality of the Schaapkop Pumpstation.**



**Figure 2: Closer view - Locality of the Schaapkop Pumpstation.**



Figure 3: Close up - Locality of the Schaapkop Pumpstation.

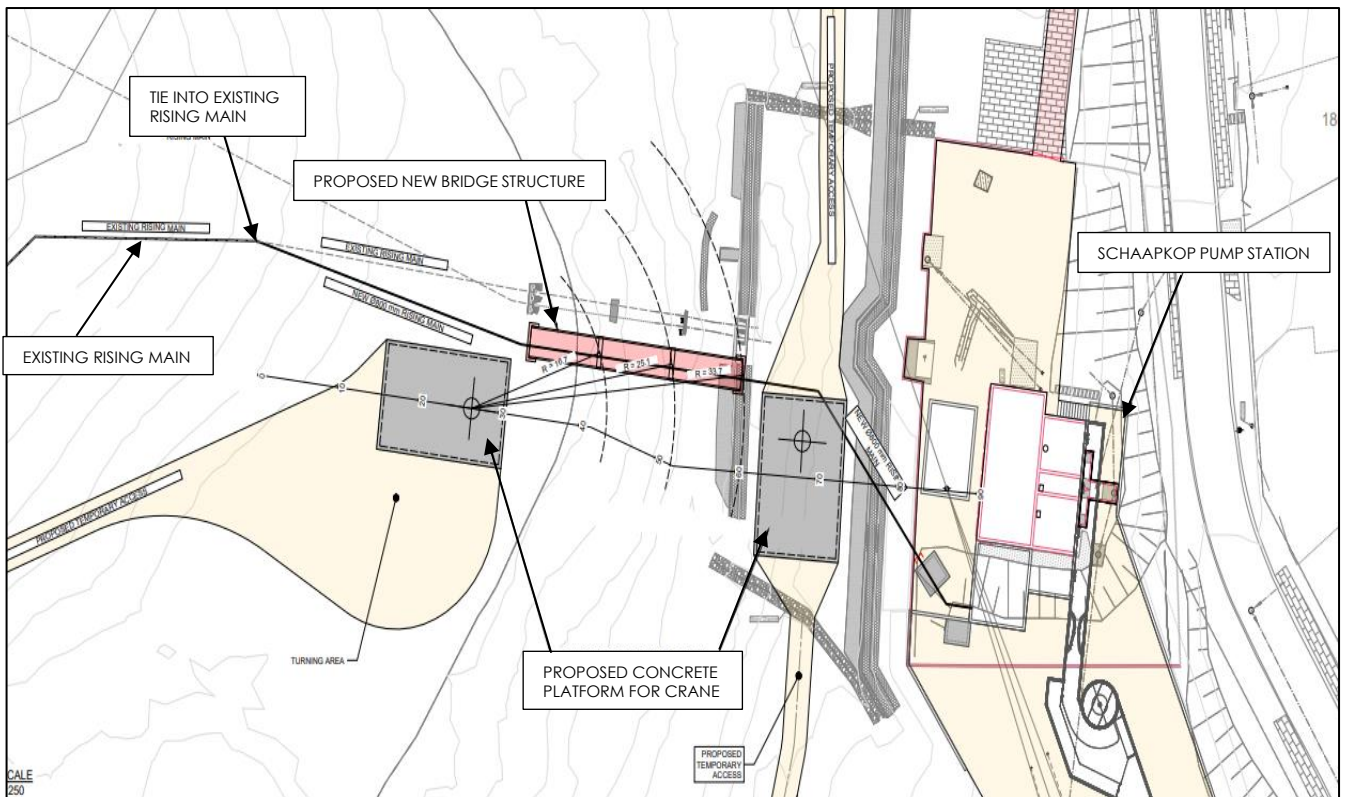


Figure 4: Site development plan



Figure 5: Overlay layout at site

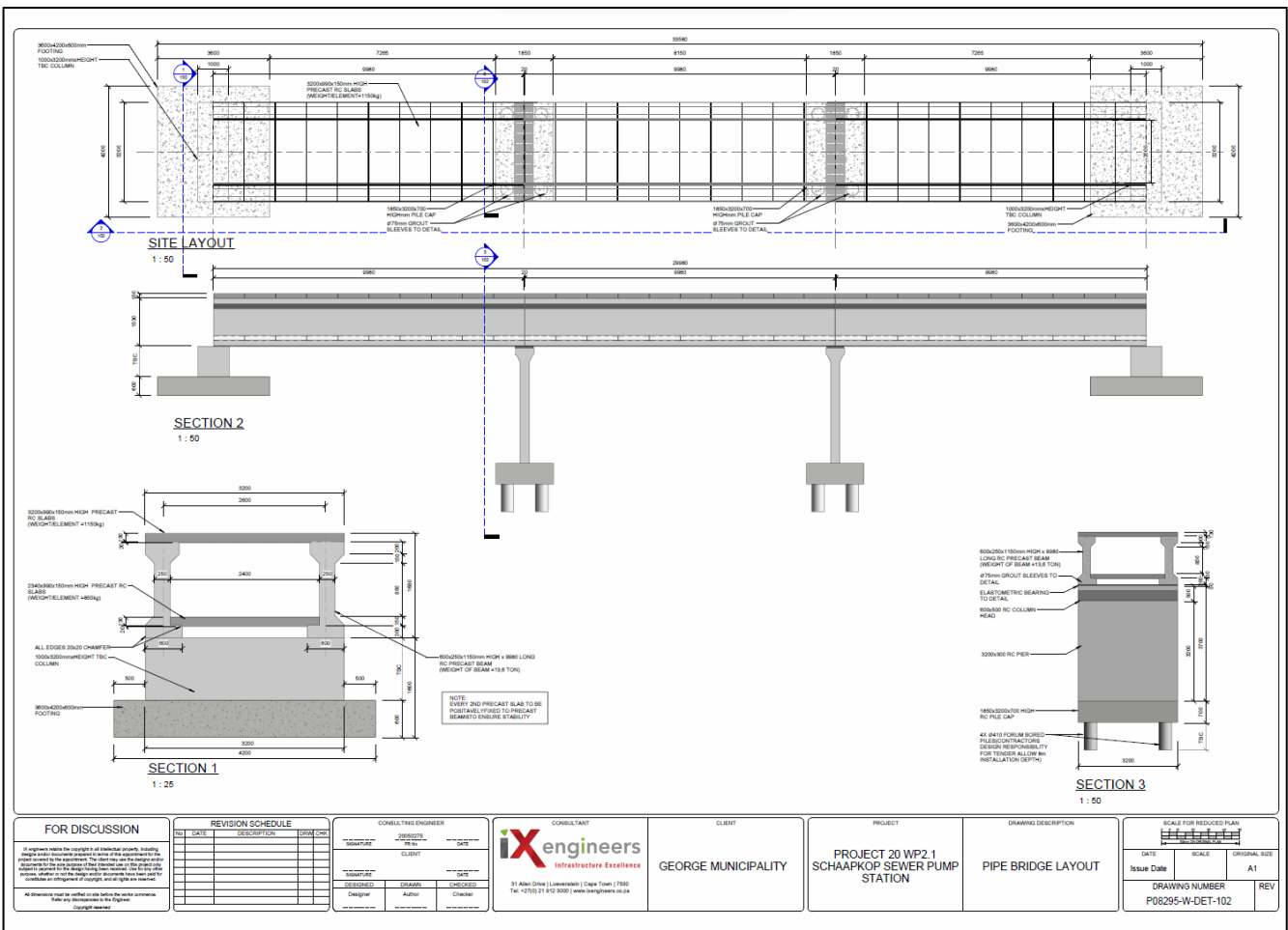


Figure 6: Pipe bridge layout

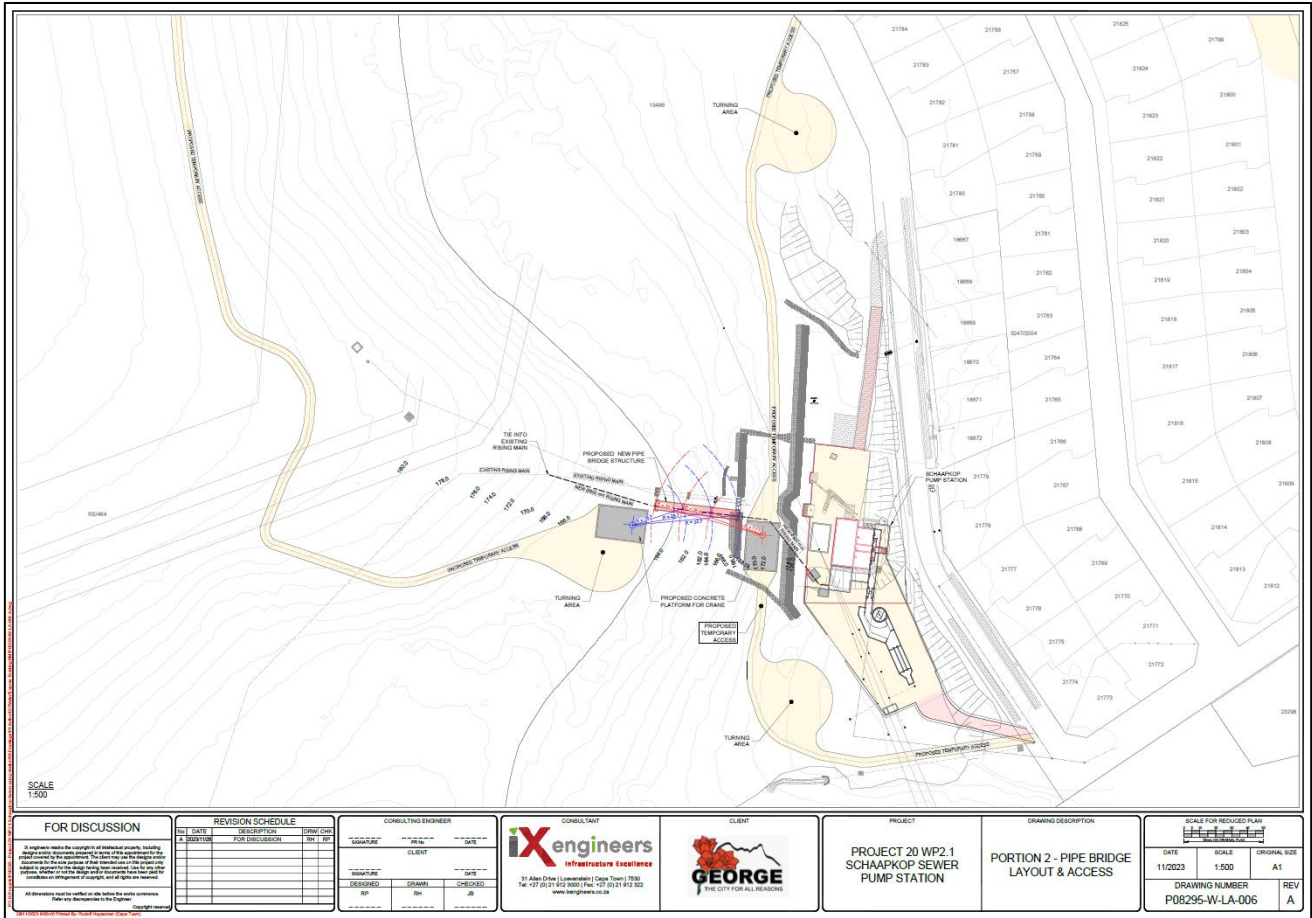


Figure 7: Site access

**Site Access and temporary storage/working/laydown areas**

Western site access

The site will be accessed from the west of the river from P.W. Botha Boulevard and run along a two-track road (existing), a section of new gravel road will have to be constructed down to the site as shown by the red line in Figure 7 and 8.

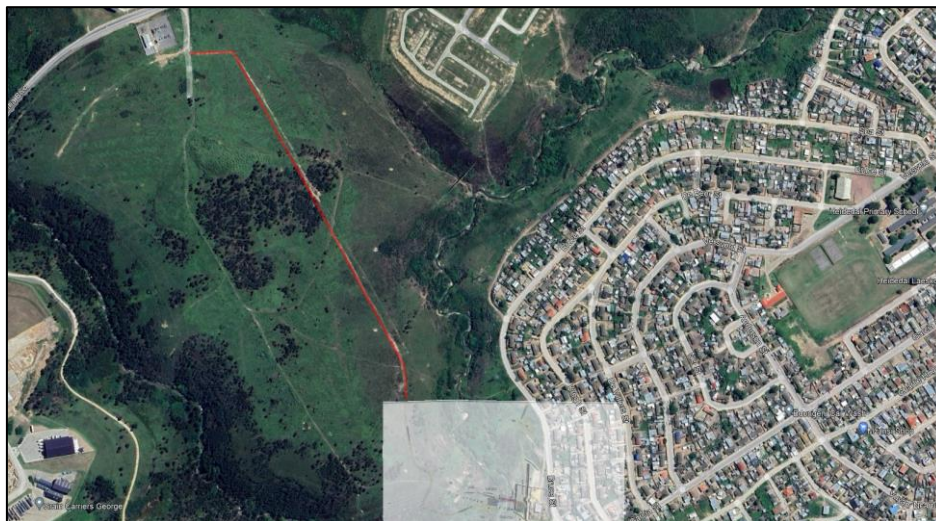


Figure 8: Western Site access

A section of gravel road needs to be constructed on the western embankment from approximately next to the electrical pylon on the top of the hill down to the working area near the pipe bridge, as shown in Figure 9 and highlighted by the red arrow.



**Figure 9: Temporary work areas and proposed gravel road down to the pipe bridge**

The existing pumpstation may be used to store materials and equipment within the yard, additional storage/laydown/work area is required on the western side of the river. Figures 7 and 9 shows the approximate working area near the pipe bridge.

Eastern site access

The site is accessed from Bruce Street which is at the end of the Borchersds neighbourhood in George. The site will be accessed from either the north or the south of the pumpstation as shown in Figure 7 and 9.

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

<b>Province</b>	Western Cape
<b>District Municipality</b>	Garden Route District Municipality
<b>Local Municipality</b>	George Municipality
<b>Ward number</b>	Ward 20
<b>Erf name</b>	Remainder of Erf 464 and Remainder of Erf 13486

## 5. Description of Environmental Setting

### 5.1 Vegetation description

**Vegetation map:** A product of The Vegetation of South Africa, Lesotho and Swaziland (VEGMAP) (Mucina & Rutherford, 2006). The South African National Biodiversity Institute (SANBI) has updated the VEGMAP (2018). These shapefiles were used. In addition, the National Web-based Environmental Screening Tool was applied to determine the Relative Plant Species Theme Sensitivity as is required of botanical specialists.

The 2018 Vegetation Map of South Africa classifies the main vegetation types found in the area as Garden Route Granite Fynbos. Due to its transformed state, Garden Route Granite Fynbos is currently listed as Critically Endangered in the Revised National List of Threatened Ecosystems (DEA, 2022). It has been transformed mainly for cultivation, pine plantations and urban development (Mucina, 2006).

**The vegetation across the site, as described by M. Berry:**

The proposed sewer pipe is located in an area that was probably used for grazing in the past but is now lying fallow. Fynbos elements are more prominent in the degraded fynbos areas. Elsewhere, only a few scattered fynbos species were noted here and there. One can distinguish between a grassier fynbos along the powerline servitude and a strip of shrubby fynbos below at the western end of the pipeline route. The grassiness can be ascribed to frequent bush-cutting during past agricultural use and probably also for safety reasons underneath the powerline. There is a high presence of invasive species, such as bugweed (*Solanum mauritianum*) and black wattle (*Acacia mearnsii*), especially in the highly degraded area. The vegetation can probably be best described as a low grassland or a degraded grassy fynbos where there is a significant fynbos component. Structurally, the shrubby fynbos can be described as a low to mid-high closed small-leaved shrubland following Campbell's classification.

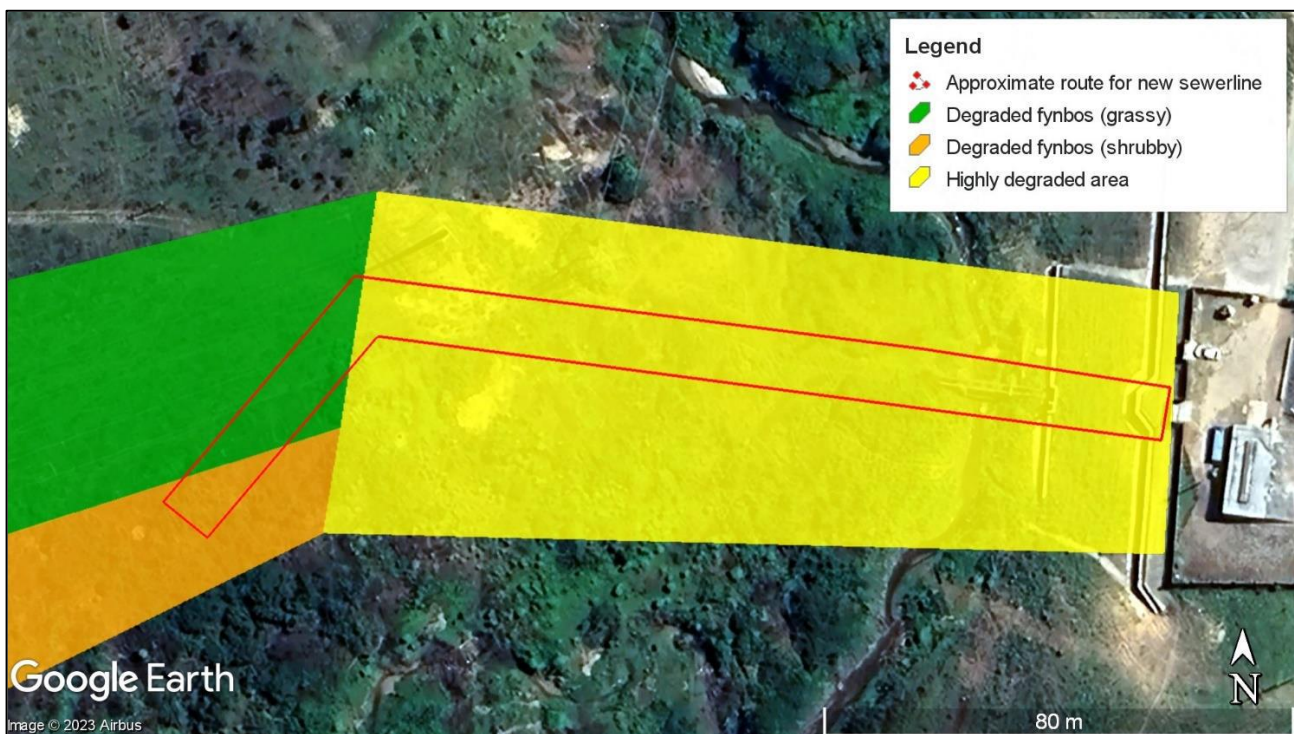


Figure 10: Botanical attributes

### 5.2 Freshwater features

Following the contextualisation of the study area with the available desktop data, a site visit was conducted to groundtruth the findings and delineate the aquatic habitat and map it within the 500m

radius of the disturbance area. The additional information collected in the field allowed for the development of an improved baseline aquatic habitat delineation map (Figure 10).

Four watercourses were identified and mapped within a 500m radius of the proposed pipeline upgrade route. For reference purposes, the identified HGM units were named as follows:

HGM1 – Skaapkop River

HGM2 – Tributary river

HGM3 – Seep

HGM4 – Seep

Although the national wetland map shows the site as being within channelled valley bottom wetland habitat, the HGM 1 watercourse is characteristic of a riparian system (the Skaapkop River). There is wetland habitat upstream of the site, but in the reach where the pipeline crosses, the valley steepens and there is a distinct channel with concentrated flows, within well-defined riverbanks. No wetland characteristics were evidenced within the proposed construction zone. Additionally, the HGM3 and HGM4 seep wetlands were not identified by the NWM5. Therefore, there are slight discrepancies between the national desktop wetland data and the in-field assessment findings.

Figure 6 shows the above-listed watercourses in relation to the pipeline and 500m radius study area.

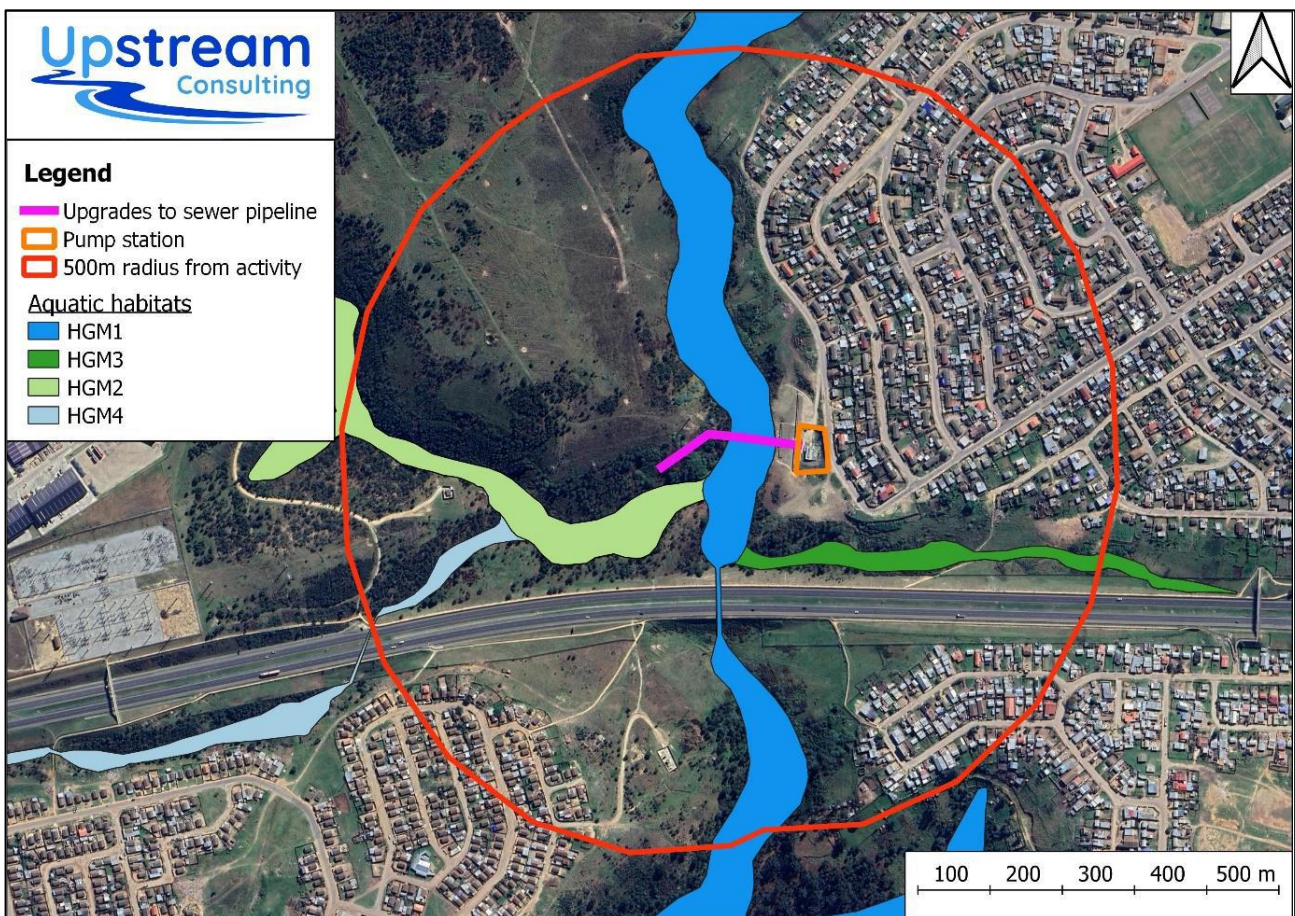


Figure 11: Map of the delineated aquatic habitat within the 500m radius study area

### **Description of Affected Aquatic Habitat**

The Skaapkop River is a perennial upper foothills system within the South Eastern Coastal Belt. It has a relatively small catchment, originating on the coastal plateau, and flowing a short distance before entering the Indian Ocean. The slightly sinuous channel is contained in a narrow valley which steepens rapidly near the coastline. In the reach assessed (HGM1), the river has a sandy channel with evidence of deposition. During low flows the active channel can be reduced to 1m in width and 30cm in depth. The fynbos thicket vegetation is heavily infested with alien invasive plant species. The dominant plant species in the riparian area and banks include *Solanum mauritianum* (alien), *Ricinus communis* (alien), *Pteridium aquilinum*, and *Pennisetum clandestinum* (alien).

Development in the catchment and along the banks has significantly modified the river regime. The system has been subjected to riparian habitat loss and disturbance due to urban encroachment, erosion and sedimentation from catchment land surface changes, water pollution and channel straightening. Sewage overflows from the pump station, as well as a stormwater pipeline outlet, have caused significant water pollution (Plate 4). There is an existing pipeline crossing the river from the Schaapkop pump station and the upgrades will follow the same route. The impacts associated with the project will be very similar to those which occurred during the construction of the existing infrastructure and are unlikely to cause any further deterioration of ecological condition.

### **Aquatic Buffer Zones**

An aquatic impact buffer zone is defined as a zone of vegetated land designed and managed so that sediment and pollutant transport carried from source areas via diffuse surface runoff is reduced to acceptable levels (Macfarlane and Bredin, 2016). Aquatic buffer zones are designed to act as barriers between human activities and sensitive water resources in order to protect them from adverse negative impacts. Buffer zones associated with water resources have been shown to perform a wide range of functions and have therefore been adopted as a standard measure to protect water resources and associated biodiversity. Currently there are no formalised riverine or wetland buffer distances provided by the provincial authorities and as such the buffer model as described Macfarlane & Bredin (2017) for wetlands and rivers was used. These buffer models are based on the condition of the waterbody, the state of the remainder of the site, coupled to the type of activity, as well as the proposed alteration of hydrological flows.

In this case, the construction activities will need to encroach into the riparian habitat and any buffer zone surrounding the pipeline upgrade route. However, areas outside of the proposed construction disturbance area should be adopted as No-Go areas. For guidance purposes, and to prevent indirect impacts, a 15m river buffer is recommended from the edge of the riparian habitat (Figure 7)



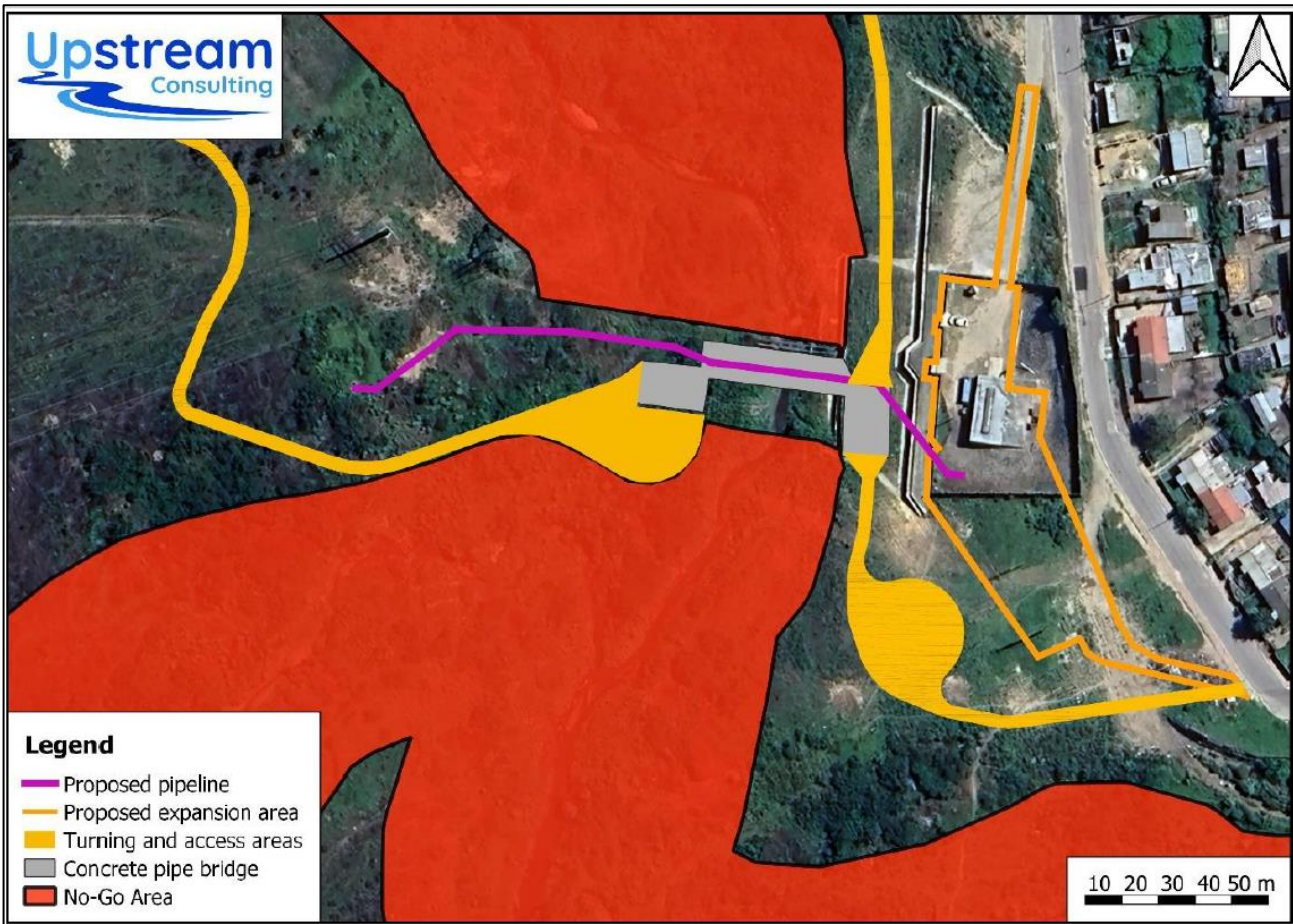


Figure 12: Aquatic Buffer Map

## 6. Legal Framework

### 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)
19	<p><b>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.</b></p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p>

	(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
46	<p><b>The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure—</b></p> <p><b>i) has an internal diameter of 0,36 metres or more; or</b>  <b>ii) has a peak throughput of 120 litres per second or more; and</b></p> <p>(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or  <b>(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;</b></p> <p>excluding where such expansion—          (aa) relates to the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve or railway line reserve; or          (bb) will occur within an urban area.</p>
48	<p><b>The expansion of—</b></p> <p><b>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or</b>          (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;</p> <p><b>where such expansion occurs—</b></p> <p><b>(a) within a watercourse;</b>          (b) in front of a development setback; or  <b>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</b></p> <p>excluding—          (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;          (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;          (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;          (dd) where such expansion occurs within an urban area; or          (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.</p>
Listed Activity No(s):	Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 3 (GN No. R. 985)
4	<p><b>The development of a road wider than 4 metres with a reserve less than 13,5 metres.</b></p> <p><b>i. Western Cape</b></p> <p><b>i. Areas zoned for use as public open space or equivalent zoning;</b>  <b>ii. Areas outside urban areas;</b>  <b>(aa) Areas containing indigenous vegetation;</b>          (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or</p> <p><b>iii. Inside urban areas:</b>          (aa) Areas zoned for conservation use; or          (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.</p>
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></p> <p><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>  <b>ii. Within critical biodiversity areas identified in bioregional plans;</b></p>

	<p>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;</b> or</p> <p>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>
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## 6.2 Other applicable legislation

George Municipality: Water & Sanitation: Civil Engineering Services, 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 Water Act (Act 36 of 1998)
- 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 George Municipality: Water & Sanitation: Civil Engineering Services 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

The site is accessed from Bruce Street which is at the end of the Borchers neighbourhood in George.

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:

- 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 2.5m 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. For guidance purposes, and to prevent indirect impacts, any area outside the developmental footprint, with a reasonable allowance for activities, is considered a no-go area.

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.

### 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 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 2m 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.

### **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.

### **8.3.6 Ablution Facilities**

Chemical toilets should be maintained on the site camp for the duration of the construction phase and rehabilitation, on a level surface and secured from blowing over and located in such a way that the toilets will not cause any form of pollution. As per the SANS10400 requirement, one ablution facility for every 8 male workers and 2 ablution facilities for every 8 female workers will be provided.

The ablution facilities must not be linked to the river or dam system in any way. Toilets must be serviced regularly and kept in an orderly state. The contractor must ensure that no spillage occurs when the toilets are cleaned, serviced or moved. The toilet facilities should be emptied on a weekly basis, by an appropriately registered service provider. Proof of this weekly servicing must be obtained and filed in the Environmental File on site. Performing ablutions outside of the provided toilet facilities is strictly prohibited and the ECO would need to regularly inspect the state of the chemical toilets to ensure compliance.

### **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 House-keeping**

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.

### **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.

### 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-authorised 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**

Construction within the vicinity of the aquatic system needs to be conducted in a conscious manner. The Freshwater Assessment Report completed by Confluent Aquatic Consulting & Research highlights the following mitigation measures to be adhered to during construction.

- A silt fence must be installed perpendicular to the angle of the slope, in between the construction site and the dam, to trap any soil or sediment mobilised from the site during the construction phase;
- The site must be monitored after every rainfall event to ensure that no sediment is being washed into the dam by erosion;
- All waste materials must be collected and disposed of at a suitable waste facility;

- The laydown area and stockpiles of construction materials or excavated materials must be located on as flat an area as possible and must not drain towards the dam. If necessary, stockpiles must be protected (e.g. through use of sandbags and/or tarpaulins) to prevent materials being washed into the dam.
- Construction activities must be confined to clearly demarcated areas so as to prevent unnecessary disturbance to the dam and the embankment leading down to the dam;
- Prevent uncontrolled access of vehicles into the dam – no vehicles to operate within 5 m of the FSL of the dam (apart from the installation of the outflow pipe from the emergency storage tank);
- Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work on site;
- No fuel storage, refuelling, vehicle maintenance or vehicle depots to be allowed on the slope between the perimeter of the construction site and the dam; and
- Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, must be located on impervious bases and should have bunds around them (sized to contain 110 % of the tank capacity) to contain any possible spills. These areas must not be located within any natural drainage areas or preferential flow paths and must be located more than 50 m away from the FSL of the dam.

### **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>	George Municipality: Water & Sanitation: Civil Engineering Services	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.
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**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>	George Municipality: Water & Sanitation: Civil Engineering Services	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 do 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 sedimentation
- Prevent pollution of surface water
- Limit the impact on terrestrial biodiversity
- Reduce the loss of indigenous flora and SCC
- limit noise
- 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: PREVENT EROSION AND SEDIMENTATION

<b><i>Impact Management Objective: To prevent sedimentation of the river caused by erosion from the construction site</i></b>			
Potential impact to avoid	<ul style="list-style-type: none"> <li>• Areas disturbed and/or cleared of vegetation (work corridor) during construction may be vulnerable to increased water and wind erosion.</li> <li>• Stockpiles of soil (topsoil/subsoil) at the site may be vulnerable to wind/water erosion.</li> </ul>		
Impact Management Outcome	Soil erosion is kept to a minimum and the river is not sedimented or polluted		
<b>IMPACT MANAGEMENT ACTIONS</b>			
Mitigation measure		Responsible party	Time period

<ul style="list-style-type: none"> <li>• A silt fence must be installed perpendicular to the angle of the slope, in between the construction site and the dam, to trap any soil or sediment mobilised from the site during the construction phase;</li> <li>• The site must be monitored after every rainfall event to ensure that no sediment is being washed into the dam by erosion;</li> <li>• All waste materials must be collected and disposed of at a suitable waste facility; and</li> <li>• The laydown area and stockpiles of construction materials or excavated materials must be located on as flat an area as possible and must not drain towards the river. If necessary, stockpiles must be protected (e.g., through use of sandbags and/or tarpaulins) to prevent materials being washed into the river.</li> <li>• A construction method statement must be compiled and available on site. It must consider the buffer zone and include methods to avoid unnecessary disturbance and prevent material being washed downslope into the river.</li> <li>• Sedimentation must be minimised with appropriate measures. Any construction causing bare slopes and surfaces to be exposed to the elements must include measures to protect against erosion using covers, silt fences, sandbags, earthen berms etc. Effective stormwater management must include effective stabilisation of exposed soil.</li> <li>• All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable.</li> <li>• Construction must have contingency plans for high rainfall events during construction. Even in the operational phase, measures to contain impacts caused during high rainfall events must be planned for and available for use.</li> <li>• The area must be maintained through alien invasive plant species removal (which is the landowner's responsibility regardless of mitigation associated with this project) and the establishment of indigenous vegetation cover to filter run-off before it enters the aquatic habitat.</li> <li>• Following construction, it is important to stabilise any steep, bare areas on the transformed slope via geotextiles and/or revegetation. Erosion features that have developed due to construction are required to be stabilised. This may also include the need to deactivate and erosion headcuts/rills/gullies that may have developed.</li> </ul>	<p>Contractor</p>	<p>Construction phase</p>
<p>Performance Indicator</p>	<p>No erosion occurring on the site or surroundings as a result of construction activities.</p>	

**OBJECTIVE 2: TO PREVENT POLLUTION OF SURFACE WATER**

<b>Impact Management Objective: To prevent pollution of surface water</b>		
Potential impact to avoid	During construction there are a number of potential pollution inputs into the aquatic systems (such as hydrocarbons and raw cement).	
Impact Management Outcome	Surface water is not polluted as a result of construction activities	
<b>IMPACT MANAGEMENT ACTIONS</b>		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> <li>Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from stormwater.</li> <li>Cement/concrete batching is to be located in an area of low environmental sensitivity away from the river channel and pre-approved by the ECO. No batching activities shall occur on unprotected ground. Adequate surface protection will be required. Concrete batching should be restricted to a level and bunded/sealed surface above the riverbanks.</li> <li>Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.</li> <li>Pumps, pipelines and other equipment should be regularly inspected and maintained.</li> <li>The Department of Water regional office should be notified, as soon as possible, of any significant chemical spill or leakage to the environment where there is the potential to contaminate surface water or groundwater.</li> </ul>	Contractor	Construction phase
Performance Indicator	Surface water is not polluted as a result of construction activities	

**OBJECTIVE 3: LIMIT IMPACT ON TERRESTRIAL BIODIVERSITY**

<b>Impact Management Objective: To limit the impact on terrestrial biodiversity</b>			
Potential impact to avoid	<ul style="list-style-type: none"> <li>• Disturbance of degraded fynbos.</li> <li>• Impact on the functionality of biodiversity network. Impact will be temporary.</li> <li>• Increased opportunity for alien infestation.</li> <li>• Erosion on the steeper slope due to poor rehabilitation efforts</li> </ul>		
Impact Management Outcome	Impact on terrestrial biodiversity is limited to what is only required to undertake the activities		
<b>IMPACT MANAGEMENT ACTIONS</b>			
Mitigation measure	Responsible party	Time period	
<ul style="list-style-type: none"> <li>• During the construction phase, demarcate/fence off the construction footprint. Restrict all construction activities, such as stockpiling, parking and cement mixing, to already disturbed areas away from natural vegetation. The contractor(s) must be made aware of the sensitive surroundings. The fynbos outside the footprint must be declared a 'no-go' area and not be disturbed in any way.</li> <li>• Pollutant substances brought onto site must be properly contained. Cement/concrete mixing must be contained on impervious and bunded surfaces. No cement mixing is allowed inside vegetated areas. Cement water is highly alkaline and considered toxic.</li> <li>• Remove topsoil and/or seedbearing indigenous plant material from the vegetated areas to be disturbed for use in the rehabilitation of disturbed areas after construction. Avoid using seed-bearing alien plant material for rehabilitation purposes.</li> <li>• Rehabilitate/revegetate all the disturbed surfaces. Erosion prevention measures may be needed on the steep slopes, such as silt fences, logs, netting or berms, to slow down runoff and potential erosion. Mulching and seeding with indigenous grass seed may also be needed. However, due to the linear nature of the project, it is expected that the disturbed areas will recover relatively quickly without the need for much intervention.</li> <li>• Engage in alien clearing, focussing on invasive species such as black wattle and bugweed. These species are category 2 and 1b invaders that require compulsory control as part of an invasive species control programme. Their control will become a medium-term maintenance requirement.</li> <li>• Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction.</li> </ul>	Contractor	Construction phase	
Performance Indicator	Impact on terrestrial biodiversity is limited to what is only required to undertake the activities		

**OBJECTIVE 4: REDUCE THE LOSS OF INDIGENOUS FLORA AND SCC**

<b><i>Impact Management Objective: To reduce the loss of indigenous Flora and SCC</i></b>			
Potential impact to avoid	Loss of indigenous flora and SCC		
Impact Management Outcome	No avoidable loss of indigenous flora and SCC		
<b>IMPACT MANAGEMENT ACTIONS</b>			
Mitigation measure	Responsible party	Time period	
<ul style="list-style-type: none"> <li>Search and rescue succulents and bulbs from the construction footprint for replanting in the disturbed areas after construction. Topsoil, cuttings and seedbearing plant material can also be salvaged for this purpose, especially cuttings from <i>Carpobrotus edulis</i>. Geophytes should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering</li> </ul>	Contractor	Construction phase	
Performance Indicator	No avoidable loss of indigenous flora and SCC		

**OBJECTIVE 5: 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 6: JOB CREATION**

<b>Impact Management Objective: To create employment opportunities with potential for skills transfer, for members of the local community.</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 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 contamination of surface water
- prevent alien vegetation establishment on the site

**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> <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> </ul>	Contractor	Post-Construction phase

<ul style="list-style-type: none"> <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>	

**OBJECTIVE 2: PREVENT CONTAMINATION OF SURFACE WATER**

<b><i>Impact Management Objective: To prevent contamination of surface water</i></b>		
<p>Potential impact to avoid</p>	<ul style="list-style-type: none"> <li>• Water and/or soil pollution cause negative changes in the physical, chemical and biological characteristics of water resources (i.e., water quality). This can result in possible deterioration in aquatic ecosystem integrity and a reduction in species.</li> </ul>	
<p>Impact Management Outcome</p>	<p>Surface water is not contaminated by the facility.</p>	
<b>IMPACT MANAGEMENT ACTIONS</b>		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> <li>• No wastewater must be allowed to enter the surrounding environment. The National Water Act imposes 'duty of care' on all landowners, to ensure that water resources are not polluted. The following Clause in terms of the National Water Act is applicable in this case: 19 (1) "An owner of land, a person in control of land or a person who occupies or uses the land on which (a) any activity or process is or was performed or undertaken; which causes, has</li> </ul>	<p>Holder of EA</p>	<p>Post-Construction phase</p>



<p>caused or likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring".</p> <ul style="list-style-type: none"> <li>• Pumps, pipelines and other equipment should be regularly inspected and maintained.</li> <li>• The Department of Water regional office should be notified, as soon as possible, of any significant chemical spill or leakage to the environment where there is the potential to contaminate surface water or groundwater.</li> <li>• It is recommended that a rehabilitation plan be compiled to return the disturbed areas (such as the turning area) which are within the riparian area, to the pre-construction state.</li> </ul>		
Performance Indicator	Surface water is not contaminated by the facility.	

**OBJECTIVE 3: PREVENT ALIEN VEGETATION ESTABLISHMENT ON THE SITE**

<b><i>Impact Management Objective: To prevent alien vegetation establishment on the site</i></b>			
Potential impact to avoid	Establishment of alien vegetation on site		
Impact Management Outcome	The site is free of alien vegetation		
<b>IMPACT MANAGEMENT ACTIONS</b>			
Mitigation measure	Responsible party	Time period	
<ul style="list-style-type: none"> <li>• Rehabilitate/revegetate all the disturbed surfaces. Erosion prevention measures may be needed on the steep slopes, such as silt fences, logs, netting or berms, to slow down runoff and potential erosion. Mulching and seeding with indigenous grass seed may also be needed. However, due to the linear nature of the project, it is expected that the disturbed areas will recover relatively quickly without the need for much intervention.</li> <li>• Engage in alien clearing, focussing on invasive species such as black wattle and bugweed. These species are category 2 and 1b invaders that require compulsory control as part of an invasive species control programme. Their control will become a medium-term maintenance requirement.</li> <li>• Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction.</li> </ul>	Contractor/ holder of EA	Post-Construction phase	
Performance Indicator	The site is free of alien vegetation		



## **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**

<p>30.(1) in this section</p> <p>(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.</p> <p>(b) "responsible person" includes any person who</p> <p>(i) is responsible for the incident</p> <p>(ii) owns any hazardous substance involved in the incident; or</p> <p>(iii) was in control of any hazardous substance involved in the incident at the time of the incident</p> <p>(c) "relevant authority" means</p> <p>(i) a municipality with jurisdiction over the area in which an incident occurs</p> <p>(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;</p> <p>(iii) the Director-General</p> <p>(iv) any other Director-General of a national department</p> <p>(2) Where this section authorises a relevant authority to take any steps, such steps may only be taken by</p> <p>(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):</p> <p>(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):</p> <p>(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):</p> <p>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.</p> <p>(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.</p> <p>(a) the nature of the incident</p> <p>(b) any risks posed by the incident to public health, safety and property</p> <p>(c) the toxicity of substances or by-products released by the incident; and</p> <p>(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</p> <p>(i) the Director-General</p> <p>(ii) the South African Police Services and the relevant fire prevention service;</p> <p>(iii) the relevant provincial head of department or municipality; and</p> <p>(iv) all persons whose health may be affected by the incident</p> <p>(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</p>
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(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*

### **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 twice monthly (every two weeks) site visits during construction and rehabilitation Phase, to check compliance with the conditions of the EA, mitigation measures and recommendations of this EMPr. 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.

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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 EMP 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.*

#	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

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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

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## **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.