



# Emergency Nondabula Water Reticulation Project

Draft Environmental Management Programme

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ILEMBE DISTRICT MUNICIPALITY



## *Document description*

Developer:

**Ilembe District Municipality**

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**Emergency Nondabula Water Reticulation Project**

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## Table of contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Introduction .....</b>                                 | <b>1</b>  |
| 1.1      | Project Overview.....                                     | 1         |
| 1.2      | Site Description.....                                     | 1         |
| 1.2.1    | Land use and Culture .....                                | 1         |
| 1.2.2    | Geology, Topography and Gradient .....                    | 1         |
| 1.2.3    | Biodiversity .....  | 1         |
| 1.2.4    | Hydrology .....   | 3         |
| 1.3      | Objectives of the Environmental Management Programme..... | 6         |
| <b>2</b> | <b>Overall Approach .....</b>                             | <b>7</b>  |
| 2.1      | Structure of the Environmental Management Programme ..... | 7         |
| 2.2      | Purpose of the EMPr .....                                 | 7         |
| 2.2.1    | Environmental Aspect.....                                 | 8         |
| 2.2.2    | Environmental Measures and Action Plans .....             | 8         |
| 2.2.3    | Responsibility .....                                      | 8         |
| 2.2.4    | Monitoring Frequency.....                                 | 8         |
| 2.3      | EMPr as a “live” document .....                           | 8         |
| 2.3.1    | Plan .....  | 8         |
| 2.3.2    | Do.....   | 9         |
| 2.3.3    | Check .....   | 9         |
| 2.3.4    | Act.....  | 9         |
| 2.4      | Details of the Project Developer .....                    | 9         |
| 2.5      | Details of the Environmental Management Team .....        | 10        |
| <b>3</b> | <b>Environmental Code of Conduct .....</b>                | <b>11</b> |
| <b>4</b> | <b>Legal Requirements.....</b>                            | <b>12</b> |
| <b>5</b> | <b>Management and Monitoring Procedures.....</b>          | <b>15</b> |
| 5.1      | Organisational Structure and Responsibilities.....        | 15        |
| 5.2      | Training and Environmental Awareness.....                 | 17        |
| 5.3      | Monitoring.....   | 18        |
| 5.4      | Reporting Procedures.....                                 | 18        |
| 5.4.1    | Documentation .....                                       | 18        |
| 5.4.2    | Environmental Register .....                              | 18        |
| <b>6</b> | <b>Environmental Management Programme.....</b>            | <b>20</b> |
| 6.1      | Pre-Construction Phase .....                              | 20        |

|        |   |    |
|--------|---|----|
| 6.1.1  | Administrative and Legal Requirements .....                                       | 20 |
| 6.1.2  | No Go Areas.....  | 21 |
| 6.1.3  | Construction Programme.....   | 22 |
| 6.1.4  | Site Establishment.....   | 22 |
| 6.1.5  | Equipment and Secured Storage Areas .....   | 23 |
| 6.1.6  | Material Management.....  | 24 |
| 6.1.7  | Education of site Staff on General Environmental Conduct.....                     | 25 |
| 6.1.8  | Fire Management .....   | 26 |
| 6.1.9  | Conservation of Resources .....   | 26 |
| 6.1.10 | Pollution Control Measures .....  | 26 |
| 6.1.11 | Solid Waste Management .....  | 26 |
| 6.1.12 | Water Management.....   | 27 |
| 6.1.13 | Protection of Fauna and Flora.....  | 27 |
| 6.1.14 | Public and Workforce Safety .....   | 28 |
| 6.1.15 | Social Impacts .....  | 28 |
| 6.2    | Construction Phase .....  | 28 |
| 6.2.1  | Administrative and Legal Requirements.....  | 28 |
| 6.2.2  | Site Establishment.....   | 29 |
| 6.2.3  | Equipment, Vehicle Maintenance Yard and Secured Storage Areas (if required) ..... | 29 |
| 6.2.4  | Stockpile Management.....   | 31 |
| 6.2.5  | Fire Management.....  | 31 |
| 6.2.6  | Stormwater Management .....   | 31 |
| 6.2.7  | Pollution Control Measures .....  | 33 |
| 6.2.8  | Solid Waste Management .....  | 33 |
| 6.2.9  | Erosion and Sedimentation Management.....   | 35 |
| 6.2.10 | Water Management.....   | 36 |
| 6.2.11 | Air Quality.....  | 37 |
| 6.2.12 | Noise .....   | 38 |
| 6.2.13 | Protection of Fauna and Flora.....  | 38 |
| 6.2.14 | Areas of Specific Importance.....   | 39 |
| 6.2.15 | Public and Workforce Safety .....   | 39 |
| 6.2.16 | Social Impacts .....  | 40 |
| 6.2.17 | Monitoring, Reporting and Record Keeping.....                                     | 40 |
| 6.2.18 | Pollution Control and Emergency Procedures.....                                   | 41 |
| 6.3    | Rehabilitation Phase.....   | 41 |
| 6.3.1  | General.....  | 41 |
| 6.3.2  | Administrative Requirements.....  | 41 |
| 6.3.3  | Site Clean-up.....  | 42 |
| 6.3.4  | Vegetation .....  | 42 |
| 6.3.5  | Land Rehabilitation.....  | 43 |

|          |  |           |
|----------|--|-----------|
| 6.3.6    | Material and Infrastructure.....                     | 43        |
| 6.3.7    | Rehabilitation.....                                  | 43        |
| 6.4      | Operational Phase.....                               | 45        |
| 6.4.1    | General.....   | 45        |
| <b>7</b> | <b>Fines and Penalties.....</b>                      | <b>46</b> |
| <b>8</b> | <b>Declaration of Understanding of the EMPr.....</b> | <b>47</b> |

## List of Figures

|   |    |
|---|----|
| FIGURE 1-1: LOCALITY MAP OF THE PROPOSED PROJECT  | 1  |
| FIGURE 1-2: OVERVIEW OF BIODIVERSITY SENSITIVITY MAP AND WATERCOURSE CROSSINGS FOR THE SITE | 3  |
| FIGURE 2-1: PHASES OF THE EMPR PROCESS AND APPLICABILITY                                    | 5  |
| FIGURE 2-2: DEMING CYCLE OF CONTINUING IMPROVEMENT  | 6  |
| FIGURE 5-1: PROJECT ORGANISATIONAL STRUCTURE  | 12 |

## List of Tables

|  |    |
|--|----|
| TABLE 1-1: SUMMARY OF WATERCOURSE CROSSINGS RELATED TO THE PROJECT | 3  |
| TABLE 2-1: PROJECT DEVELOPER                                       | 7  |
| TABLE 2-2: ENVIRONMENTAL TEAM                                      | 8  |
| TABLE 4-1: SUMMARY OF THE ENVIRONMENTAL LEGISLATION                | 9  |
| TABLE 5-1: ROLES AND RESPONSIBILITIES OF KEY MEMBERS               | 13 |
| TABLE 7-1: FINE SYSTEM TO BE IMPLEMENTED                           | 43 |

## List of Appendices

|  |
|--|
| APPENDIX A - SPILL CONTINGENCY PLAN      |
| APPENDIX B - GEOHYDROLOGICAL STUDY       |
| APPENDIX C - STORMWATER MANAGEMENT PLAN  |
| APPENDIX D - WETLAND REHABILITATION PLAN |

## Glossary

|   |  |
|---|--|
| <b>Accident</b>                             | A road vehicle accident.   |
| <b>Building and Demolition Waste</b>        | Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition.   |
| <b>Contractor</b>                           | Companies appointed on behalf of the Developer to undertake activities, as well as their sub-contractors and suppliers.  |
| <b>Construction Project Management Team</b> | The team consists of a Project Manager as well as a Safety, Health and Environmental officer.  |
| <b>Degradation</b>                          | The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation.  |
| <b>Domestic Waste</b>                       | Domestic waste means waste, excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.   |
| <b>Emergency</b>                            | An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.  |
| <b>Environment</b>                          | In terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) (as amended), “Environment” means the surroundings within which humans exist and that are made up of: <ul style="list-style-type: none"> <li>(i) the land, water and atmosphere of the earth;</li> <li>(ii) micro-organisms, plants and animal life;</li> <li>(iii) any part or combination of (i) of (ii) and the interrelationships among and between them; and</li> <li>(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.</li> </ul> |
| <b>Environmental Control Officer</b>        | An individual nominated through the Developer to be present on site to act on behalf of the Developer in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities.   |
| <b>Environmental Impact</b>                 | A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s activities, products or services.   |
| <b>Environmental Management Plan</b>        | A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project.   |

|   |  |
|---|--|
| <b>General Waste</b>                            | General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes - <ol style="list-style-type: none"> <li>(i) domestic waste;</li> <li>(ii) building and demolition waste;</li> <li>(iii) business waste; and</li> <li>(iv) inert waste.</li> </ol>  |
| <b>General Waste Landfill Site</b>              | A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste.  |
| <b>Hazardous Waste Landfill Site</b>            | A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.  |
| <b>Impact</b>                                   | A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space   |
| <b>Incident</b>                                 | An undesired event which may result in a significant environmental impact but can be managed through internal response.  |
| <b>Mitigation</b>                               | Measures designed to avoid, reduce or remedy adverse impacts.  |
| <b>Principal Agent</b>                          | The principal agent is appointed by the Developer to oversee the overall project management and the management of the professional project team.   |
| <b>Recovery</b>                                 | The controlled extraction of a material or the retrieval of energy from waste to produce a product.  |
| <b>Re-Use</b>                                   | To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.  |
| <b>Recycle</b>                                  | A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.  |
| <b>Safety, Health And Environmental Officer</b> | The SHE officer is a Contractor representative, responsible for the safety, health and environmental aspects on the construction site. The SHE officer will be responsible for the day-to-day monitoring of the EMPr and Health and Safety Plan. The SHE Officer may act as the Site Environmental Officer (SEO) if competent to do so.  |
| <b>Waste</b>                                    | Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered - <ol style="list-style-type: none"> <li>(i) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;</li> <li>(ii) which the generator has no further use of for the purposes of production;</li> <li>(iii) that must be treated or disposed of; or</li> <li>(iv) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but—             <ul style="list-style-type: none"> <li>• a by-product is not considered waste; and</li> <li>• any portion of waste, once re-used, recycled and recovered, ceases to be waste</li> </ul> </li> </ol> |



**Waste Disposal Facility**

Waste disposal facility means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.

**Workforce**

The entire project team including people employed by the Principal Agent or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contactors and casual labour.

## *Abbreviations and Acronyms*

|         |  |
|---------|--|
| BA      | Basic Assessment (i.e. EIA process)  |
| BAR     | Basic Assessment Report  |
| DWS     | National Department of Water and Sanitation (previously Department of Water Affairs (DWA))   |
| EA      | Environmental Authorisation  |
| ECO     | Environmental Control Officer  |
| EDTEA   | KwaZulu-Natal Provincial Department of Economic Development, Tourism and Environmental Affairs (previously Department of Agriculture and Environmental Affairs (DAEA)) |
| EIA     | Environmental Impact Assessment  |
| EMPr    | Environmental Management Programme   |
| I&AP    | Interested and Affected Party  |
| IEM     | Integrated Environmental Management  |
| NEMA    | National Environmental Management Act (Act No. 107 of 1998) (as amended)   |
| NEM:AQA | National Environmental Management: Air Quality Act (Act No. 39 of 2004)  |
| NEM:BA  | National Environmental Management: Biodiversity Act (Act No. 10 of 2004)   |
| NEM:ICM | National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008)  |
| NEM:PAA | National Environmental Management: Protected Areas Act (Act No. 57 of 2003)  |
| NEM:WA  | National Environmental Management: Waste Act (Act No. 36 of 1998) (as amended)   |
| NHRA    | National Heritage Resources Act (Act No. 25 of 1999)   |
| NWA     | National Water Act (Act No. 36 of 1998)  |
| RoW     | Right of Way   |
| S&EIR   | Scoping and Environmental Impact Report Process  |
| SEMA    | Suite of Environmental Management Acts (i.e. NEMA, NEM:AQA, NEM:BA, NEM:ICM, NEM:PAA, NEM:WA, and NWA)   |
| WMA     | Water Management Area  |
| WUL(A)  | Water Use Licence (Application)  |

# 1 Introduction

## 1.1 Project Overview

**Royal HaskoningDHV** was appointed by the **iLembe District Municipality** (IDM) to carry out **Environmental Services** which include the drafting of an **Environmental Management Programme** (EMPr) for the proposed Emergency Nondabula Water Reticulation project.

The Emergency Nondabula Water Reticulation project was initiated to improve the security of potable water supply to residents in the Nondabula area.

It is proposed that a network of pipelines are constructed within the Nondabula rural community, located in Ward 9 of the Nodwengu Traditional Council in the Ilembe District Municipality, KwaZulu-Natal. See **Figure 1-1** (below) for the Locality Map.

The pipelines will link into the existing pipeline network and provide potable water to the community.

The original scope of the project, as assessed by the EAP and the team of specialists, was reduced due to a change in the municipal boundaries (between the Ilembe- and uMgungundlovu District Municipalities) and under the revised scope includes only the alignment and facilities that fall within the IDM.

The project will consist of the construction of:

- a DN150 Steel / PVC rising main of 4.7 km with a throughput of 15 m<sup>3</sup>/h;
- a borehole with a yield capacity of 15 m<sup>3</sup>/h at an altitude of 292 m;
- a 500 kℓ prefabricated steel reservoir (16 m diameter x 3.1 m height);
- a secondary booster pump;
- a 50 kℓ elevated prefabricated steel tank (5 m square x 2 m height); and
- reticulation pipelines of various diameters (ranging from 110 mm to 32 mm) approximately 38 km in length and 568 m of yard connections.

The proposed infrastructure is aligned along existing roads where disturbance has already occurred and due to the scale of the construction works, can be limited to a 10 m wide construction servitude on either side of the pipeline (20 m total width) in low-medium sensitivity areas and a 5 m wide construction servitude on either side of the pipeline (10 m total width) in high sensitivity areas (refer to **Figure 1-2** below).

This EMPr aims to identify all possible environmental sensitivities, and provide mitigation measures for the proposed upgrade.

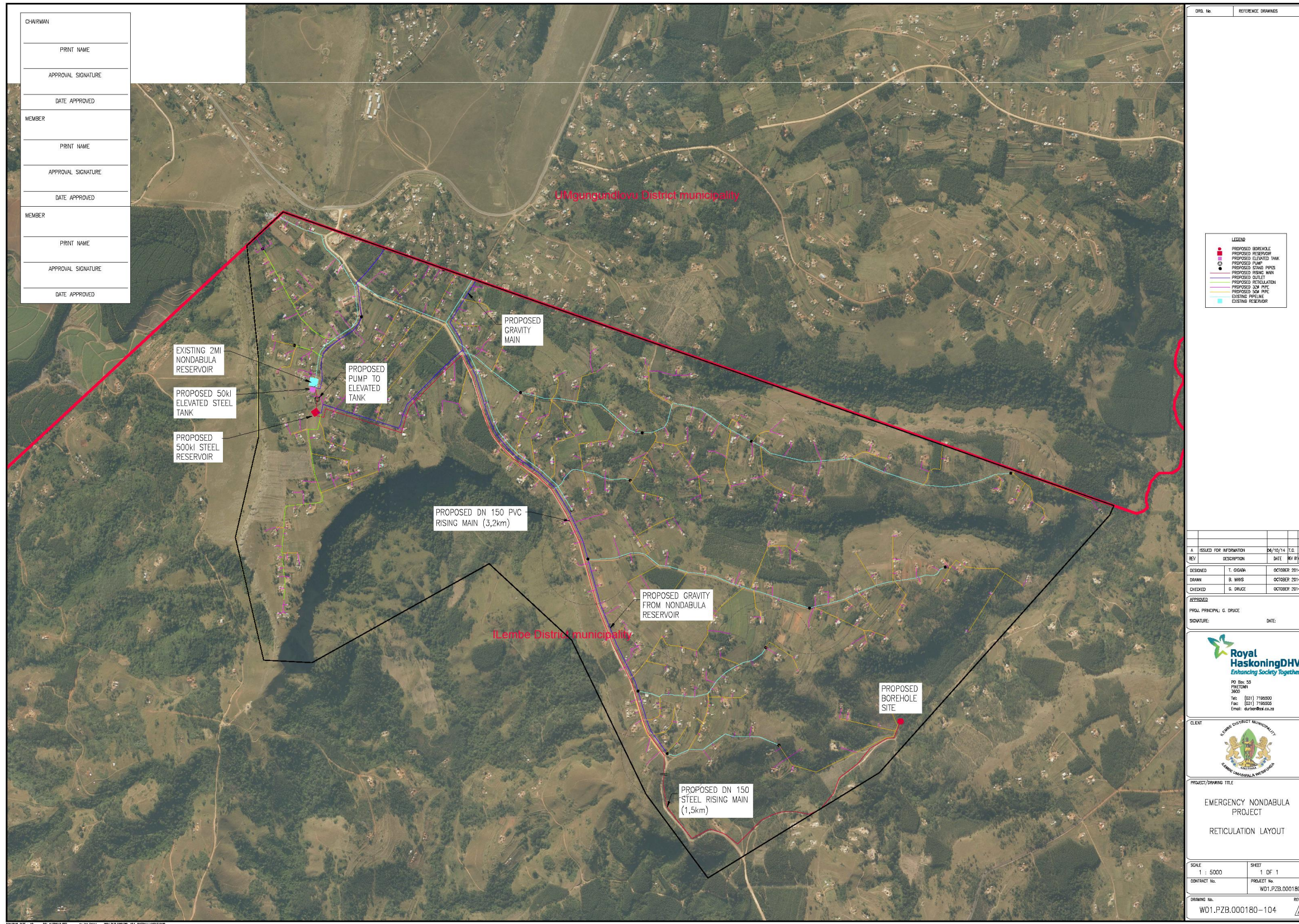


Figure 1-1: Locality map of the proposed project

## 1.2 Site Description

### 1.2.1 Land use and Culture

The project area is classified as a rural area. The land cover surrounding the study area is indigenous woody vegetation in the river valleys and grasslands, which are mostly disturbed, in the higher altitude areas. The footprint is situated in a communal area with a large percentage of rural homesteads occupied by Zulu-speaking small-scale subsistence farmers. Most of these are spatially ordered in the traditional Nguni dispersed settlement pattern or more modern variations thereof. The majority of homesteads, in the area demarcated for development, appear to have been built in the last 30 years or so.

No heritage sites were located in the development footprint. No modern gravesites are found within 40 m from the identified *in situ* proposed development. There is a possibility that some “invisible” graves may occur within the various homesteads located in the footprint. The development footprint is also not part of any known cultural landscape.

### 1.2.2 Geology, Topography and Gradient

The geology of the site varies quite a bit and includes sediments of the Karoo Supergroup which has Dwyka tillites, mudstones and lesser sandstones of the Adelaide and Tarkastad Subgroups (Beaufort Group) with intrusions of Dolorite. There is also Ecca Group shale present. In some areas, Ordovician Natal Group Sandstones dominate and in other areas layered quartz-feldspar metasediments (Mapumulo Group, mokolian) are dominant.

The topography of the region is hilly. Altitude ranges from 1 030 m on the western boundary to 760 m around the proposed Ozwathini borehole.

Much of the western parts of the Ilembe District is characterised by slopes in excess of 40%, with the Ndwedwe and Maphumulo local municipalities only having approximately 14.56% and 5.42% of their respective areas available to annual cropping ( $\leq 12\%$  slope).

### 1.2.3 Biodiversity

The Emergency Nondabula Water Reticulation project is dominated by completely transformed KwaZulu-Natal Sandstone Sourveld and surrounded by old agricultural lands with limited patches of secondary successional grasslands dominated by increaser or pioneer grasses and pioneer weedy plant species and alien invasive plant species.

The secondary successional grasslands adjacent to the fields provides limited suitable habitat for certain rodent species such as the Highveld Gerbil, House Rats (villages) as well as Multimammate Mouse. Rodents construct burrows in the sandy soils and attract other predators such as the Slender Mongoose.

Bird species around the villages are restricted to granivorous (seed eating) birds such as Laughing Dove, Cape Turtle Dove. The majority of bird species recorded during the site visit were observed in the remnant pockets of moist closed woodland patches and Scarp Forest within the steep wooded south-western valley.

Reptile species are extremely sensitive to habitat destruction and transformation. Low reptile diversity is expected within the project area. Species recorded during the brief field assessment included Cape Dwarf Gecko (*Lygodactylus capensis*), Southern Tree Agama (*Acanthocercus atricolis*), Spotted Bush-Snake (*Philothamnus semivariegatus*) and Variable Skink (*Trachylepis varia*).

Low amphibian diversity is expected along the non-perennial drainage lines due to extensive habitat transformation and deterioration of water quality. Suitable breeding habitat occurs within the non-perennial drainage lines and valley bottom wetland adjacent to the proposed borehole for certain frog species including Common River Frogs (*Amietia angolensis*), Painted Reed Frogs (*Hyperolius marmoratus*), Red Toad (*Schismaderma carens*) Raucous Toad (*Amietophrynus rangeri*) and Guttural Toad (*Amietophrynus gutturalis*).

No red listed frog species are known from the 2930 BD Quarter Degree Grid Cell (QDGC) in which the Emergency Nondabula Water Reticulation project site is situated in or are likely to occur within the footprint of the reticulation pipelines, boreholes or the reservoirs.

No threatened reptile species are likely to occur on the site or the immediate open areas surrounding the site due to extensive habitat transformation and degradation. Low reptile diversity is expected on the site due to extensive habitat destruction and low diversity within the transformed and heavily degraded *Aristida junciformis* grasslands.

One threatened bird species was observed during the brief site visit, namely the 'Vulnerable' Southern Bald Ibis. A single adult Southern Bald Ibis was observed foraging in the remnant patches of secondary successional *Aristida junciformis* grassland. If any threatened bird species occur it is highly unlikely that the Emergency Nondabula Water Reticulation pipeline servitudes, reservoir sites and borehole will occur within critical habitat for any threatened bird species, including the single Southern Bald Ibis. The Southern Bald Ibis is wary of humans and will move away from any disturbances associated with the construction of the reticulation pipelines. No development is proposed within the remnant open secondary successional *Aristida junciformis* grasslands, as well as Sandstone Sourveld adjacent to the Emergency Nondabula Water Reticulation Project.

No sensitive or endangered mammals were recorded within the Emergency Nondabula Water Reticulation study area. The majority of larger mammal species are likely to have been eradicated or have moved away from the area during the previous residential and agricultural developments. This is mainly a result of increased development pressure and human disturbances such as hunting and poaching (wire snares), as well as habitat alteration and degradation by vegetation clearance and frequent fires. Smaller mammal species are extremely vulnerable to snares and poaching activities as well as feral cats.

It is highly unlikely that the proposed Emergency Nondabula Water Reticulation project constitutes significant habitat for any threatened mammal species or for mammals in general. The remnant patches of closed woodland and scarp forest provide suitable habitat for certain large mammal species.

The Scarp Forest and rocky ridge and cliffs must be considered as high sensitivity habitat with unique vegetation as well as fauna. No development is proposed within the rocky mountain slopes, cliffs and summits or the deeply incised wooded valleys around the proposed project area.

No protected tree species were recorded within and immediately adjacent to the proposed project area.

No rare or threatened plants were recorded within this transformed vegetation units occurring within the proposed project area. Marginally suitable habitat occurs within the Scarp Forest situated within the closed wooded rocky cliffs and ravines as well as relic patches rocky KwaZulu-Natal Sandstone Sourveld on the margins of the plateau for certain red listed species. More intensive surveys conducted over extended periods are required to determine their current conservation status in the area.

No pipelines or reservoirs are proposed within these sensitive areas.

There are however a number of so-called *Orange List* species (i.e. species of provincial importance) present within the proposed reticulation alignment – it is thus required that the alignment be directly surveyed by a qualified specialist and relevant plants demarcated, or if relocation / removal is required, obtain approval from the provincial authority prior to relocation / removal thereof.

A Biodiversity Sensitivity Map is provided (in **Figure 1-2** below).

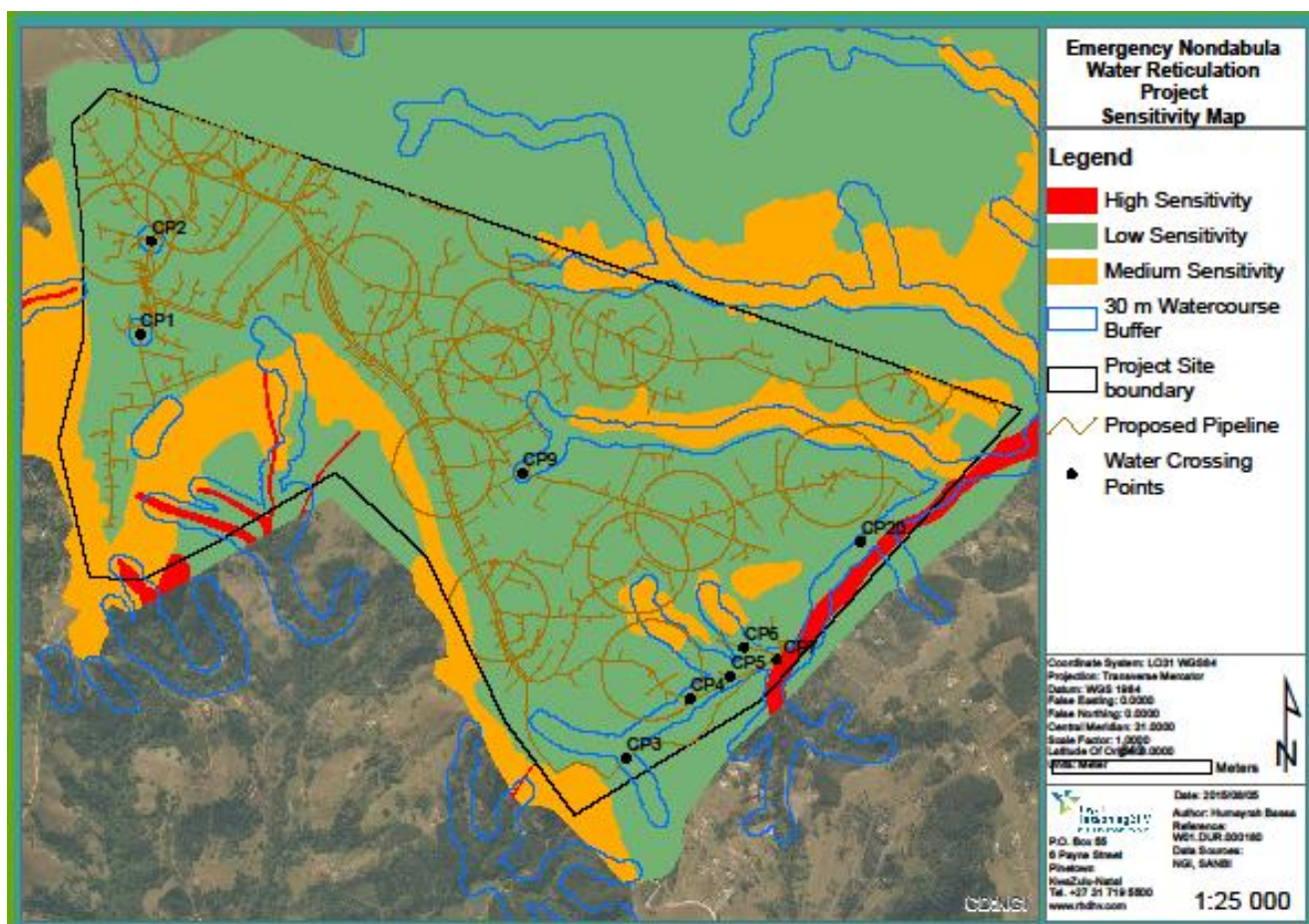


Figure 1-2: Overview of Biodiversity Sensitivity Map and Watercourse Crossings for the Site

### 1.2.4 Hydrology

The study area falls within the North Eastern Coastal Belt Aquatic Ecoregion, which can be considered to contain irreplaceable and highly significant aquatic biodiversity and a sensitive aquatic community.

The study area falls within the U40H and U30A quaternary catchments. A small portion falls within the U40E quaternary catchment.

The study area is drained by a number of perennial drainage lines flowing eastwards within the various valleys bottom positions within the study area. The Nsuzi River is located on the eastern side of the study area. Furthermore Hillslope seeps and Bench wetlands were identified within the study area, as well as channelled and unchannelled valley bottom wetlands located along the perennial drainage lines. The drainage lines are characterised by the presence of alien invasive riparian vegetation and in some instances an active water channel was are present within the valley bottoms.

A total of nine (9) watercourse crossings will occur for which an Environmental Authorisation and Water Use Licence have been applied for. These crossings are identified in the table below (Table 1-1) and figure above (see Figure 1-2).

Table 1-1: Summary of watercourse crossings related to the project

| Crossing Point | Coordinates                 | Wetland Type | River Name         |
|----------------|-----------------------------|--------------|--------------------|
| CP1            | 29°24'45.36"S 30°51'04.54"E | Seep (Bench) |                    |
| CP2            | 29°24'33.19"S 30°51'06.21"E | Seep (Bench) |                    |
| CP3            | 29°25'40.46"S 30°52'16.61"E | Riverine     | Nsuzi River system |
| CP4            | 29°25'32.80"S 30°52'25.99"E | Riverine     | Nsuzi River system |
| CP5            | 29°25'29.82"S 30°52'31.96"E | Riverine     | Nsuzi River system |

| Crossing Point | Coordinates                 | Wetland Type             | River Name         |
|----------------|-----------------------------|--------------------------|--------------------|
| CP6            | 29°25'26.04"S 30°52'34.02"E | Riverine                 | Nsuze River system |
| CP7            | 29°25'27.64"S 30°52'38.95"E | Riverine                 | Nsuze River system |
| CP9            | 29°25'03.44"S 30°52'01.22"E | Channelled Valley Bottom |                    |
| CP20           | 29°25'12.42"S 30°52'51.39"E | Riverine                 | Nsuze River system |

## 1.3 Objectives of the Environmental Management Programme

The EMPr has the following objectives:

- Ensuring compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international.
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the proposed project.
- To identify measures that could optimise beneficial impacts.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the draft environmental management plan must be implemented, where appropriate.
- Provide rational and practical environmental conditions / requirements to:
  - Minimise disturbance of the natural environment;
  - Ensure water resource protection;
  - Prevent or minimise all forms of pollution;
  - Protect indigenous flora and fauna;
  - Prevent soil and sand erosion and facilitate the re-vegetation of affected areas;
  - Maintenance of newly re-vegetated areas;
  - Restrict noise disturbance; and
  - Ensure compliance with all applicable laws, regulations, standards and guidelines for the protection of the environment.
- Adopt the best practical means available to prevent or minimise adverse environmental impacts.
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste.
- Train the Developer, its employees and contractors with regard to their environmental obligations.

## 2 Overall Approach

### 2.1 Structure of the Environmental Management Programme

The EMPr typically provides proposed mitigation and management measures for the following phases of the project shown in **Figure 2-1**.





**Figure 2-1: Phases of the EMPr process and applicability**

## 2.2 Purpose of the EMPr

The EMPr includes the following:

- Roles and responsibilities of the various responsible parties involved with the various phases of the project;
- Standards, guidelines and legal requirements (including any possible environmental permits required and the processes to be followed in obtaining these permits);
- Environmental specifications for construction;
- Environmental specifications for operation;
- Environmental specifications for rehabilitation; and
- Environmental awareness plan.

The EMPr specifies the minimum requirements to be implemented by the Developer, as per the scope of works and scope of the environmental authorisation, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices.

The EMPr also provides the framework for environmental monitoring throughout the construction, operational and rehabilitation phases.

The provisions of this EMPr are binding on the Developer / Contractor during the life of the project. The EMPr must be binding on the Developer or any authority to which responsibility for all buildings and associated infrastructure has been delegated to.

It is noted that protection of the environment is enshrined in the Duty of Care requirement of the National Environmental Management Act (Act No. 107 of 1998) (as amended), which thus means that it is the duty of all land-owners and users to ensure that the activities they carry out on a site do not cause detriment to the environmental facets thereof. The EMPr thus functions as a monitorable mechanism that will allow the IDM the ability to ensure that all that operate on the site do so in an environmental safe manner. It is also structured in such a way that the conditions may be linked to a standard construction contract. The EMPr is a live document which must be continuously updated, with the approval of the Competent Authority.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time.

Each action within the EMPr is supported by the priority of when the specific action will need to be implemented. Each of these aspects is briefly described below for ease of reference.

### 2.2.1 Environmental Aspect

This section highlights the various aspects associated with the project i.e. the Developer / Contractor's activities that will interact with the environment.

## 2.2.2 *Environmental Measures and Action Plans*

This section indicates the actions required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.

## 2.2.3 *Responsibility*

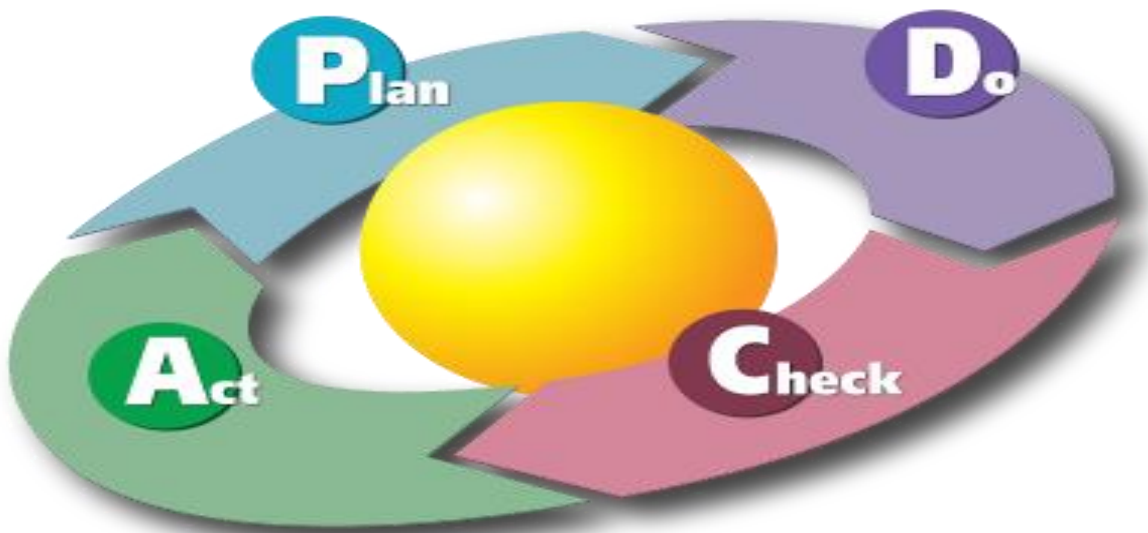
This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr.

## 2.2.4 *Monitoring Frequency*

This section indicates when the actions for that specific aspect must be implemented and/or monitored.

## 2.3 EMPr as a “live” document

The approach adopted for this EMPr is derived from the Deming Cycle (**Figure 2-2**), a cycle of continuous improvement that entails the reiterative actions of plan, do, check, act, and critically to then return to the planning phase.



**Figure 2-2: Deming cycle of continuing improvement**

### 2.3.1 *Plan*

Project-specific planning for the proposed project involves consideration of the legal triggers, the specifics of the proposed development, and the nature of the receiving environment. This provides a starting point for targeted environmental management objectives.

Environmental performance indicators are then determined with measurable targets prescribed to monitor the environmental performance of the project.

Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.

### 2.3.2 Do

Throughout the development's life-span, the developer will be required to develop and maintain a Quality Management System (QMS) – designed to ensure that best management practices are implemented in day-to-day management.

Such a QMS must at least include the following information:

- Ensure that the necessary Licences, Authorisations are in place;
- Location and extent of associated infrastructure;
- Associated activities, such as the transportation of people and equipment;
- Resources and experience required (staffing);
- Materials and equipment to be used;
- Management actions;
- Human resources used;
- Construction-monitoring activities;
- Emergency / disaster incident and reaction procedures; and
- Rehabilitation procedures for the impacted environment.

These topics will be cross-linked into the contracts related to the development of the project.

### 2.3.3 Check

A system of assessing monitoring results has been developed to check the environmental management performance. Continuous assessment facilitates proactive management of the environmental issues. Mitigation measures can then be successfully implemented on an on-going basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy of the EMPr. Regular auditing of environmental performance is prescribed to prove and preserve accountability.

### 2.3.4 Act

The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting system. Precautionary mitigation measures and corrective actions will be prescribed and instructions will be given in order to implement these in the field. The findings of monitoring and auditing programmes can also be used to update the EMPr.

Although the EMPr is a project-specific document, it is dynamic and must be updated regularly to address the changing circumstances of the scheme.

## 2.4 Details of the Project Developer

**Table 2-1: Project Developer**

| Developer      |                               | Ilembe District Municipality |
|----------------|-------------------------------|------------------------------|
| Contact Person | Dumisani Khoza                |                              |
| Postal Address | P.O Box 1788, KwaDukuza, 4450 |                              |
| Telephone      | 032 551 8713/8722             |                              |
| Fax            | 032 437 9587                  |                              |

|                  |                                     |
|------------------|-------------------------------------|
| <b>Developer</b> | <b>Ilembe District Municipality</b> |
| <b>Email</b>     | dumisanik.khoza@ilembe.gov.za       |

## 2.5 Details of the Environmental Management Team

Table 2-2: Environmental Team

| Name                     | Organisation       | Responsibility                        | Telephone    | Email                       |
|--------------------------|--------------------|---------------------------------------|--------------|-----------------------------|
| <b>Bronwen Griffiths</b> | Royal HaskoningDHV | Project Principal                     | 021 936 7714 | Bronwen.Griffiths@rhdhv.com |
| <b>Humayrah Bassa</b>    | Royal HaskoningDHV | Project Manager                       | 031 719 5551 | Humayrah.Bassa@rhdhv.com    |
| <b>Bjorn Hoffmann</b>    | Royal HaskoningDHV | Environmental Assessment Practitioner | 031 719 5571 | Bjorn.Hoffmann@rhdhv.com    |

## 3 Environmental Code of Conduct

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on site activities. This environmental code of conduct provides the basic rules that must be strictly adhered to.

It is the responsibility of the Site Environmental Officer and ECO (as appointed) to ensure that each contractor, sub-contractor and the workforce understand and adhere to the Code of Conduct.

## Environmental Code Of Conduct

**All persons are obliged to keep to the rules of this code of conduct**

**Ignorance, negligence, recklessness or a general lack of commitment resulting in environmental degradation or pollution must not be tolerated!**

### Environmental Rules

- Do not waste electricity, water or consumables;
- Only use authorised accesses;
- Do not litter;
- Dispose solid waste to the correct waste containers provided;
- Prevent pollution;
- Use the toilet facilities provided;
- Do not dispose contaminated waste water to the stormwater or the environment;
- Immediately report any spillage from containers, plant or vehicles;
- Do not burn or bury any waste in the sand;
- Do not trespass onto private properties;
- Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal;
- Never damage or remove any trees, shrubs or branches unless it forms part of working instructions;
- Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area;
- Know the fire fighting procedure and locations of fire fighting equipment; and
- Know the environmental incident procedures.

## 4 Legal Requirements

The following is a summary of the environmental legislation applicable to the proposed project.

**Table 4-1: Summary of the environmental legislation<sup>1</sup>**

| Legislation  | Sections   | Relates To   |
|--|------------|--|
| The Constitution (No. 108 of 1996)                                       | Chapter 2  | Bill of Rights.  |
|  | Section 24 | Environmental rights.  |
| National Environmental Management Act (Act No. 107 of 1998 [as amended]) | Section 2  | Defines the strategic environmental management goals and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment. |
|  | Section 24 | Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.  |

<sup>1</sup> It is noted that the legal framework provided in this document relates to the most recent legislation at the time of compiling this document. It is noted that legislation changes continuously and it is the Developers responsibility to ensure that they are compliant with the most relevant legislation at any given time.

| Legislation  | Sections                 | Relates To   |
|--|--------------------------|--|
|  | Section 28               | The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.   |
| EIA Regulations (2014)   | GNR 983                  | Activities requiring a Basic Assessment study to be undertaken.  |
|  | GNR 984                  | Activities requiring a Scoping and Impact Assessment study to be undertaken.   |
|  | GNR 985                  | Activities in special geographical areas requiring a Basic Assessment study to be undertaken.  |
| National Waste Act (Act No. 59 of 2008) and List of Waste Activities (November 2013) |                          | Provides for specific waste management measures and the remediation of contaminated land.  |
| Norms and Standards for the Storage of Waste, 2013                                   | GNR 926: Sections 7 – 20 | Provides specific guidelines for the operational procedures for a facility for the storage of waste.   |
| National Heritage Resources Act (Act No. 25 of 1999) and regulations                 | Section 34               | No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.   |
|  | Section 35               | No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.   |
|  | Section 36               | No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority.<br>"Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place. |
|  | Section 38               | This section provides for Heritage Impact Assessments (HIAs), not already covered under the environmental law. Where covered under such law the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The HIA is thus approved under the environmental authorisation, which must take into account the provincial heritage resources authorities' comments prior to making a decision on the HIA.   |
| National Environmental Management Biodiversity Act (Act No. 10 of 2004)              |                          | Provides for planning and monitoring for biodiversity, identification and protection of threatened or protected ecosystems and species, and dealing with alien species and the requirement for permitting.   |
| National Forests Act (Act No. 84 of 1998)  | Chapter 3                | Special measures to protect forests and selected protected trees   |

| Legislation   | Sections   | Relates To  |
|---|------------|---|
| Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)                    | Chapter 4  | Mineral and environmental regulation  |
| National Environmental Management: Air Quality Act (Act No. 39 of 2004)                 | Section 34 | Control of noise  |
|   | Section 35 | Control of offensive odours   |
| National Dust Control Regulations (GNR 827 of November 2013)                            |            | Control of dust.  |
| Occupational Health and Safety Act (Act No. 85 of 1993)                                 | Section 8  | General duties of employers to their employees  |
|   | Section 9  | General duties of employers and self-employed persons to persons other than their employees   |
| National Water Act (Act No. 36 of 1998) and regulations                                 | Section 19 | Prevention and remedying the effects of pollution   |
|   | Section 20 | Control of emergency incidents  |
|   | Section 21 | Water uses for which a Water Use Licence is required.   |
| Hazardous Substances Act (Act No. 15 of 1973) and regulations                           |            | Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances  |
| National Road Traffic Act (Act No. 93 of 1996)  |            | Road safety   |
| Ordinance   |            | Town Planning and Townships Ordinance 15 of 1986  |
| By-laws   |            | Promulgated by-laws: <ul style="list-style-type: none"> <li>✦ Waste Management</li> <li>✦ Property Rates by laws</li> <li>✦ Legal Services</li> <li>✦ Municipal Cemeteries</li> <li>✦ Discharge of Industrial Effluent</li> <li>✦ Electricity Supply</li> </ul> |
| SANS 10103 (Noise Regulations)  |            | The measurement and rating of environmental noise with respect to annoyance and to speech communication   |
| KZN Nature Conservation Ordinance (Ordinance 15 of 1974)                                |            | Sensitive species are protected under this Ordinance and must be considered and permits applied for.  |
| Conservation of Agricultural Resources Act (1983); Including Regulations 15 & 16 (2001) |            | Alien invasive plants are regulated and must be considered.   |

# 5 Management and Monitoring Procedures

## 5.1 Organisational Structure and Responsibilities

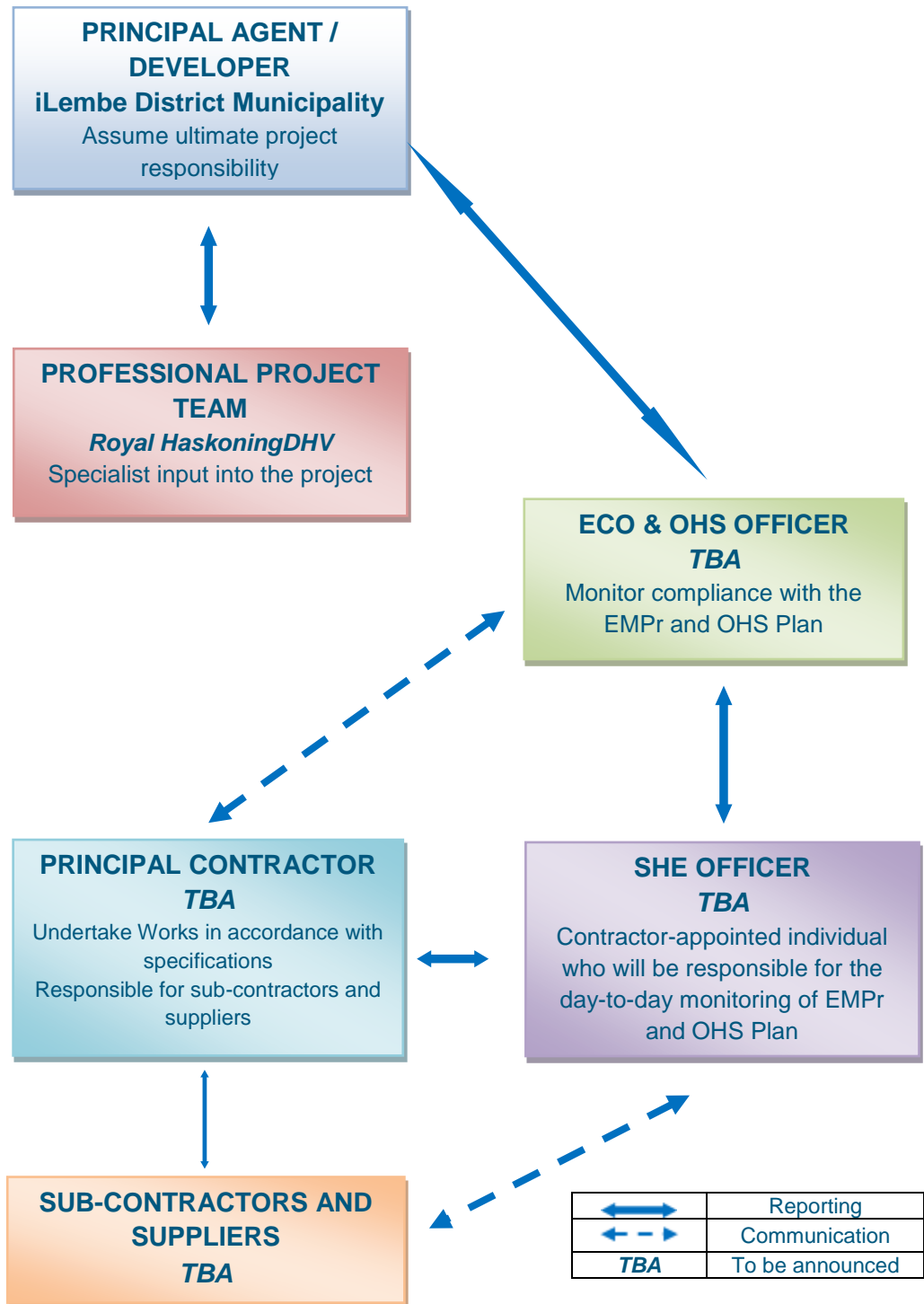


Figure 5-1: Project organisational structure

*Note:* The organisational structure will need to be reviewed and finalised on inception, especially in terms of both reporting and responsibility of the involved parties.



**Table 5-1: Roles and responsibilities of key members**

| <b>Principal Agent</b>  |
|---|
| <p><b>The Principal Agent will:</b></p> <ul style="list-style-type: none"> <li>▪ Ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project.</li> <li>▪ Ensure that the Contractor(s) is aware of all specifications, legal constraints and standards and procedures pertaining to the project specifically with regards to the environment.</li> <li>▪ Ensure that all stipulations within the EMPr are communicated and adhered to by its appointed Contractor(s).</li> <li>▪ Ensure that financial provision has been made for the environmental component of the project within in tender submissions.</li> </ul>  |
| <b>Environmental Control Officer</b>  |
| <p><b>The Environmental Control Officer will:</b></p> <ul style="list-style-type: none"> <li>▪ Monitor the implementation of the EMPr during construction activities and must remain employed until the site is handed over to the Developer by the Contractor.</li> <li>▪ Be familiar with the recommendations and mitigation measures of the associated EMPr for the project.</li> <li>▪ Ensure site protection measures are implemented on site.</li> <li>▪ Ensure that the Principal Contractor, sub-contractors, construction teams and the Principal Agent are in compliance with the EMPr at all times.</li> <li>▪ Monitor all site activities monthly for compliance.</li> <li>▪ Conduct monthly audits of the site according to the EMPr, and report findings to the Principal Agent/Contractor.</li> <li>▪ Recommend corrective action for any environmental non-compliance at the site.</li> <li>▪ Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions. These monthly reports are to be submitted to the Developer and the Principal Agent.</li> <li>▪ Conduct once-off training with the Contractor on the EMPr and general environmental awareness.</li> <li>▪ Submission of an environmental audit report to the Developer and Principal Agent upon completion of the project.</li> <li>▪ It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Principal Agent and the SHE Officer.</li> </ul> |
| <b>Occupational Health And Safety Officer</b>   |
| <p><b>The Occupational Health and Safety Officer will be responsible for undertaking of the following:</b></p> <ul style="list-style-type: none"> <li>▪ Compilation of a comprehensive project health and safety risk assessment (HSRA).</li> <li>▪ Compilation of health and safety specifications based on risks identified.</li> <li>▪ Reviewing and approval of health and safety plan(s) submitted by appointed Principal Contractor(s).</li> <li>▪ Conducting bi-monthly health and safety inspections and compiling monthly OHS reports.</li> <li>▪ Conducting monthly health and safety audits with audit reports.</li> <li>▪ Assisting the Principal Agent / Contractor in the investigation of major accident / incidents.</li> <li>▪ Monitoring of site activities for compliance to the Occupational Health and Safety Act and Regulations.</li> <li>▪ Establishment and monitoring of project health and safety file.</li> <li>▪ Monitoring the health and safety performance of the Principal Contractor(s).</li> <li>▪ Preparation of project close-out reports and submission of project health and safety files to the Developer.</li> </ul>   |

### Safety Health And Environmental (SHE) Officer

#### The SHE Officer will:

- Be fully conversant with the Environmental Management Programme.
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them.
- Compilation of Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved.
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor.
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr.
- Take appropriate action if the specifications contained in the EMPr are not followed.
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr.
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr.
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Ensuring that the list of transgressions issued by the ECO is available on request.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints.
  - Health and safety incidents.
  - Incidents involving hazardous materials stored on site.
  - Non-compliance incidents.

### Principal Contractor (Including Sub-Contractors)

- Execution of Works in accordance with contract specifications.
- Complying with the environmental management specifications.
- Adhering to any instructions issued by the SHE Officer on advice of the ECO.
- Arrange for all employees and those of sub-contractors to receive training before the commencement of construction in order that they are aware of the conditions of the EMPr.

## 5.2 Training and Environmental Awareness

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm.

Training needs must be identified based on the available and existing capacity of site personnel (including the Contractors and Sub-contractors) to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- promoting environmental awareness;
- informing the Contractor of all environmental procedures, policies and programmes applicable;
- providing generic training on the implementation of environmental management specifications; and
- providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

Training will be done in a verbal format. The training will be a once-off event; however the Contractor must make provision for weekly training or “Toolbox Talks”.

In addition to training, general environmental awareness must be fostered among the project’s workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimised and environmental compliance maximized.

## **5.3 Monitoring**

A monitoring programme will be in place not only to ensure compliance with the EMPr through the contract / work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required.

Monthly audits will be conducted by the Environmental Control Officer.

Compilation of a monthly audit report with a rating of the compliance with the EMPr.

The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. The Contractor must be held liable for all unnecessary damage to the environment.

## **5.4 Reporting Procedures**

### **5.4.1 Documentation**

The following documentation must be kept on site in order to record compliance with the EMPr:

- EMPr and EA plus any other licences that may be required must also be maintained on site
- Record of Complaints;
- Monitoring Checklists;
- Non-conformance Reports;
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

### **5.4.2 Environmental Register**

The ECO will put in place an Environmental Register, note that this may form part of the overall site construction related register.

The ECO will ensure that the following information is recorded for all complaints / incidents:

- Nature of complaint / incident;
- Causes of complaint / incident;
- Party / parties responsible for causing complaint / incident;
- Immediate actions undertaken to stop / reduce / contain the causes of the complaint / incident;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint / incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented; and
- Copies of all correspondence received regarding complaints / incidents.

The SHE Officer (or the team member assigned this task) must maintain the Environmental Register that will:

- Contain environmental complaints and correspondence received from the public to the Contractor or the ECO;
- Record and report incidents that cause harm or may cause harm to the environment;
- Record all hazardous materials used on site; and
- Maintain a record of all Waste Disposal Manifests detailing the nature of the waste disposed of, the waste classification and the location of the site to which such waste was sent.

The above records will form an integral part of the Contractors' Records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the ECO or the Principal Agent.

## 6 Environmental Management Programme

### 6.1 Pre-Construction Phase

#### 6.1.1 Administrative and Legal Requirements

| Environmental Aspect   | Environmental Measures and Action Plans  | Responsibility           | Monitoring Frequency |
|--|--|--------------------------|----------------------|
| <b>Roles and Responsibilities for Environmental Management</b> | The overall responsibility for ensuring the implementation of this EMPr rests with the Developer.  | Developer / Contractor   | Daily                |
|  | Responsibility for on-site implementation of environmental management as well as the associated cost with the implementation of the EMPr rests with all appointed contractors, sub-contractors and suppliers.  |                          |                      |
|  | Developer and appointed contractors must ensure that all permanent and temporary staff, sub-contractors and suppliers adhere to this EMPr.   | Developer                | Monthly              |
|  | Prior to the commencement of construction as well as during construction, appropriate signage must be erected along the roads warning both pedestrians and motorists of earthworks.  | Contractor               |                      |
|  | The Principal Contractor must appoint a senior staff member directly involved in the site construction activities as the Site Environmental Officer (SEO). This person must ensure the implementation of and adherence to the EMPr in the contractor's execution of the day-to-day construction activities.<br>This environmental responsibility must be specified in this person's duties, which will also include: <ul style="list-style-type: none"> <li>i. Liaison with the appointed Environmental Control Officer (ECO);</li> <li>ii. The on-site implementation of the EMPr;</li> <li>iii. Monitoring inappropriate behaviour, environmental impacts, including pollution and environmental incidents; and</li> <li>iv. The implementation of corrective action.</li> </ul>               | Contractor               | Daily                |
|  | The proposed project activities must not be in conflict with any South African legislation, Municipal plans, policies or by-laws. Thus no construction activities, beyond that approved by the relevant environmental authorisation without the approval of the ECO and the KZN EDTEA, must be undertaken.   | Developer                | Monthly              |
|  | All procedures and equipment must be used in accordance with the Occupational Health and Safety Act Regulations (OHSA) of South Africa, Act No. 85 of 1993.  | Contractor / OHS Officer |                      |
|  | The Developer must appoint a person with a qualification in environmental management and relevant monitoring, auditing and training experience as the ECO for the full scope of the authorisation. The ECO must be the responsible person for monitoring and reporting on compliance in respect to the implementation of the EMPr. Environmental Authorisation (EA) requirements include: <ul style="list-style-type: none"> <li>i. Monthly monitoring of activities to ensure compliance with the EMPr;</li> <li>ii. Liaison and on-going communication with the EO;</li> <li>iii. Ensuring environmental awareness among members of the workforce;</li> <li>iv. Ensuring that the Contractor/s and members of the construction workforce are aware of the requirements of the EMPr;</li> </ul> | Developer / ECO          | Monthly              |

| Environmental Aspect                 | Environmental Measures and Action Plans  | Responsibility         | Monitoring Frequency |
|--------------------------------------|--|------------------------|----------------------|
|                                      | v. Implementing preventative and corrective actions in accordance with the requirements of the EMPr and outcomes of environmental monitoring;  |                        |                      |
|                                      | vi. Reporting of environmental incidents that may occur on site in accordance with the requirements of the EMPr and environmental legislation; and<br>vii. Monitoring and reporting on compliance with this EMPr to the Developer and KZN EDTEA.   |                        |                      |
|                                      | The contractor and SEO must inform the Developer and ECO prior to the commencement of any significant construction activity.   | Contractor / SEO       | Daily                |
| Compliance                           | All persons employed by the Developer or their contractors, must abide by the requirements of the EMPr.  | Developer / Contractor | Daily                |
|                                      | The Developer or Contractor must not direct a person to undertake any activity which would place them in contravention of the specifications contained within the EMPr.  | Developer / Contractor | Daily                |
|                                      | A fine system must be implemented for wilful negligence or non-compliance resulting in environmental degradation or pollution. The fine system must be agreed to by all parties at the outset of the construction phase. Please refer to Section 7.  | Developer              | Daily                |
| Environmental Training and Induction | In terms of section 2(h) and (j) of the NEMA, the contractor has the responsibility to ensure all personnel involved in the project are aware of, and familiar with, the EMPr, the key environmental issues and consequences of non-compliance to the EMPr.  | Contractor             | Daily                |
|                                      | To ensure compliance to the EMPr by contractors, sub-contractors and employees, the Developer must ensure that the EMPr forms part of the formal site induction for all contractors, sub-contractors and casual labourers, preferably in their native language. The induction training will, as a minimum, include the following:<br>i. The environmental impacts, actual or potential, of their work activities;<br>ii. All site labour must be educated about the value of wild animals and the importance of their conservation;<br>iii. The environmental benefits of improved personal performance;<br>iv. Their roles and responsibilities in achieving compliance with the EMPr, including emergency preparedness and response requirements; and<br>v. The potential consequences of departure from specified operating procedures. | Developer              | Monthly              |
|                                      | All contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance register.   | Contractor             | Monthly              |
|                                      |  |                        |                      |

### 6.1.2 No Go Areas

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility             | Monitoring Frequency |
|----------------------|--|----------------------------|----------------------|
| "No Go" Areas        | No-go areas must be agreed to in consultation between the ECO, SEO, and, Developer prior to construction.  |                            |                      |
|                      | During the construction phase, workers must be limited to areas under construction within the site and access to the undeveloped areas.  | ECO / Developer Contractor | Daily                |
|                      | A construction work servitude of 20 m (10 m on either side) must be maintained for all areas. The exception is for sensitive areas as indicated on the sensitivity map and confirmed and demarcated in consultation with the ECO, in which case a 10 m (5 m on either side) servitude must be maintained. Sensitive areas are presented in <b>Figure 1-2</b> . |                            |                      |

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
|                      | Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste must be strictly prohibited in identified no-go areas.                                | Contractor     |                      |
|                      | No workers must access the construction site indiscriminately via existing or newly shaped vegetated embankments. Identified or existing public access ways must be used. |                |                      |
|                      | Unauthorised access onto/into private properties is strictly prohibited.  |                |                      |

### 6.1.3 Construction Programme

| Environmental Aspect                   | Environmental Measures and Action Plans  | Responsibility        | Monitoring Frequency |
|--|--|-----------------------|----------------------|
| <b>Construction Programme</b>          | The construction programme will need to take into account limitations of the environment in terms of construction activities.  | Contractor            | Daily                |
|  | The Contractor must ensure that all affected landowners / authorities are advised of the proposed programme at the beginning of the contract period.   | Contractor            | Monthly              |
|  | A record of notification must be provided to the Site Engineer (SE) / Project Manager (PM) / EO and ECO.   |                       |                      |
|  | Construction activities are to be confined to normal working hours (07h00 – 18h00) Mondays to Fridays only.  | Contractor            | Daily                |
|  | Longer construction period time periods may be negotiated with surrounding land-owners and tenants if so required.   |                       |                      |
|  | The Contractor must ensure that as far as practicable, all construction activities within wetland and riparian environments are undertaken within the dry season.  | Contractor / Engineer | Monthly              |
| <b>Information to Affected Parties</b> | The Contractor is to make contact with those people who are directly affected by the Construction activities providing the following information: <ul style="list-style-type: none"> <li>i. When construction will take place near the affected party's property;</li> <li>ii. How the Construction will affect normal activities (residence access etc.);</li> <li>iii. Details of potential high impact activities such as blasting of rock; and</li> <li>iv. Contact information in case of emergencies.</li> </ul> | Contractor            | Monthly              |

### 6.1.4 Site Establishment

| Environmental Aspect                 | Environmental Measures and Action Plans  | Responsibility   | Monitoring Frequency |
|--------------------------------------|--|------------------|----------------------|
| <b>Contractor Site Establishment</b> | The site selected for Construction Camp must ensure that potential negative impacts on the biophysical environment are kept to a minimum and must be approved by the ECO / Engineer prior to implementation. | Contractor / ECO | Monthly              |
|                                      | The identified construction camp (and any additional areas still to be identified and approved) must be defined, secured and limited to authorised contractors only.   | Contractor       | Monthly              |
|                                      | If the Contractor chooses to locate the camp site on private land, he must get prior written permission from both the Developer and the landowner.   | Contractor / ECO | Monthly              |

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility         | Monitoring Frequency |
|----------------------|---|------------------------|----------------------|
|                      | On-site accommodation will not be required. The construction camp can thus be comprised of: <ul style="list-style-type: none"> <li>i. site office;</li> <li>ii. ablution facilities;</li> <li>iii. designated first aid area;</li> <li>iv. eating areas;</li> <li>v. staff lockers;</li> <li>vi. storage areas;</li> <li>vii. batching plant (if required);</li> <li>viii. refuelling areas (if required);</li> <li>ix. maintenance areas (if required); and</li> <li>x. crushers (if required).</li> </ul> | Contractor             | Daily                |
|                      | The size of the construction camp must be minimised.  | Contractor             | Monthly              |
|                      | Adequate parking must be provided for site staff and visitors at the Construction camp.   |                        |                      |
|                      | Vegetation removed for any additional construction camp establishment must to be kept to a minimum. No trees are to be removed with the exception of alien weeds and invader plants identified and approved by the EO and ECO.  |                        |                      |
|                      | No persons, other than a night-watchman / security guard, may stay overnight at the construction camp.  |                        |                      |
| Sanitation           | Where waterborne sewerage is not available, temporary chemical toilets must be provided by a company that has been approved by the Developer. Such toilets must be available for all site staff, both at the construction camp, and on site as agreed by the Developer.   | Contractor / SEO / ECO | Daily                |
|                      | At least one toilet facility must be provided for every 15 labourers. Male and female toilets must be provided and clearly identified as such.  |                        |                      |
|                      | The EO and ECO must be consulted on the location of any temporary chemical toilets.   |                        |                      |
|                      | Temporary toilets must be located outside of the 1:100 year floodline and at least 50 metres away from any watercourses.  | Contractor             |                      |
|                      | In cases where facilities are linked to existing sewage structures, all necessary regulatory requirements concerning construction and maintenance should be adhered to.   |                        |                      |
|                      | Bins and/or skips must be provided at convenient intervals for disposal of waste within the construction camp as well as along the work areas.  |                        |                      |
|                      | Recycling and the provision of separate waste receptacles for different types of waste must be encouraged.  |                        |                      |

### 6.1.5 Equipment and Secured Storage Areas

| Environmental Aspect                | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|-------------------------------------|---|----------------|----------------------|
| Equipment and Secured Storage Areas | Storage areas for material and equipment must be situated within the boundaries of the construction camp or as agreed in consultation with the EO and ECO.<br>These areas must be secured to prevent unintended damage or pollution to the environment.<br>Storage areas must be located outside the 1:100 year floodline and away from any watercourses. | Contractor     | Daily                |



| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |         |
|----------------------|---|----------------|----------------------|---------|
|                      | Storage areas must be designated, demarcated and fenced if necessary.   |                | Monthly              |         |
|                      | Storage areas must be secure, so as to minimise the risk of crime. They must also be safe from access by children / animals, etc.   |                | Daily                |         |
|                      | Definitions of hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic.<br>Some examples of hazardous substances / materials include:<br>i. diesel, petroleum, oil, bituminous products;<br>ii. cement;<br>iii. solvent based paints;<br>iv. lubricants;<br>v. explosives;<br>vi. drilling fluids;<br>vii. pesticides, herbicides; or<br>viii. Liquefied Petroleum Gas |                |                      |         |
|                      | All hazardous substances must be stored within a secured storage area with impervious lining and bunding. Drip trays must be used where appropriate.  |                |                      | Daily   |
|                      | Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.  |                |                      |         |
|                      | Fuel storage areas must be at least 3.5 m from any buildings, boundaries or combustible / flammable material(s).  |                |                      |         |
|                      | Symbolic safety signs (in accordance with SABS 1186) must be erected at storage facilities and tank capacities must be clearly indicated (in accordance with SABS 0232).  |                |                      |         |
|                      | Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.  |                |                      |         |
|                      | Contractors must submit a method statement and plans for the storage of hazardous materials and emergency procedures.   |                |                      | Monthly |

### 6.1.6 **Material Management**

| Environmental Aspect    | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|-------------------------|---|----------------|----------------------|
| <b>Source Materials</b> | Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc.), and submit these to the Developer, EO and ECO for approval prior to commencement of any work. | Contractor     | Monthly              |
|                         | Where possible, a signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation.  |                |                      |

### 6.1.7 Education of site Staff on General Environmental Conduct

| Environmental Aspect                                | Environmental Measures and Action Plans  | Responsibility          | Monitoring Frequency |
|---|--|-------------------------|----------------------|
| <p><b>Environmental Education and Awareness</b></p> | <p>Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered must include:</p> <ul style="list-style-type: none"> <li>i. What is meant by “environment”;</li> <li>ii. Why the environment needs to be protected and conserved;</li> <li>iii. How construction activities can impact on the environment;</li> <li>iv. What can be done to mitigate against such impacts;</li> <li>v. Awareness of emergency and spills response provisions;</li> <li>vi. Value of wild animals and the importance of their conservation; and</li> <li>vii. Social responsibility during construction. E.g. being considerate to local residents.</li> </ul> <hr/> <p>It is the ECOs responsibility to provide site managers with environmental training and to ensure that the managers/foremen have sufficient understanding to pass this information onto the construction staff:</p> <ul style="list-style-type: none"> <li>i. Translators are to be used where necessary;</li> <li>ii. The Developer must be on hand to answer questions;</li> <li>iii. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered;</li> <li>iv. Use must be made of environmental awareness posters on site;</li> <li>v. Construction workers must be made aware that they are not to make excessive noise (e.g. Shouting / hooting) when the site is near to commercial / residential areas; and</li> <li>vi. The need for a “clean site” policy also needs to be explained to the construction workers.</li> </ul> | <p>Contractor / ECO</p> | <p>Monthly</p>       |
| <p><b>Worker Conduct on Site</b></p>                | <p>A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:</p> <ul style="list-style-type: none"> <li>i. No alcohol / drugs to be present on site;</li> <li>ii. No firearms or hunting weapons allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel);</li> <li>iii. Prevent excessive noise;</li> <li>iv. Prevent unsocial behaviour;</li> <li>v. Bringing pets onto the site is forbidden;</li> <li>vi. No harvesting of firewood from the site or from the areas adjacent to it;</li> <li>vii. Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g. fires for cooking; the use of surrounding bush as a toilet facility is forbidden);</li> <li>viii. Trespassing on private / commercial properties adjoining the site is forbidden;</li> <li>ix. Driving under the influence of alcohol is prohibited; and</li> <li>x. Other than pre-approved security staff, no workers must be permitted to live on site.</li> </ul>   |                         |                      |

### 6.1.8 Fire Management

| Environmental Aspect   | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|------------------------|--|----------------|----------------------|
| <b>Fire Management</b> | The workforce must be made aware of fire prevention and fire fighting measures, including the position and usage of fire extinguishers and on-site fire hydrants, etc.<br>Cross links to the Occupational Health and Safety requirements to be confirmed and enforced – requirements in terms of OHS must prevail. | Contractor     | Monthly              |

### 6.1.9 Conservation of Resources

| Environmental Aspect             | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------------------|--|----------------|----------------------|
| <b>Conservation of Resources</b> | Energy saving initiatives must be implemented. These could include timers or day / night switches on lighting or solar panel lighting. | Developer      | Monthly              |
|                                  | Water saving devices must be installed at new and upgraded ablution facilities (where applicable).                                     |                |                      |

### 6.1.10 Pollution Control Measures

| Environmental Aspect              | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|-----------------------------------|---|----------------|----------------------|
| <b>Pollution Control Measures</b> | The Contractor must prepare an emergency procedure and a procedure for the management e.g. storage, decanting and disposal of hazardous substances.   | Contractor     | Monthly              |
|                                   | Holding tanks containing fuel, hydrocarbon, chemicals must be bunded and lined with an impermeable liner to contain any spillages. The containment volume must be 110% of the total volume stored in the tanks. |                |                      |
|                                   | The Spill Contingency Plan attached as <b>Appendix A</b> must be implemented in the event of a spillage.  |                |                      |
|                                   | Suitable spill kits must be kept at the construction camp at all times.   |                |                      |
|                                   | Fifty kilograms (50 kg) of hydro carbon absorbent to be stored at the construction camp at all times.   |                |                      |

### 6.1.11 Solid Waste Management

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| <b>General Waste</b> | Facilities for solid waste collection are to be provided.  | Contractor     | Monthly              |
|                      | The Contractor is to institute a daily litter collection programme. The collected waste is to be disposed of regularly and proportionately to its generation at a licensed site designed for waste disposal. |                |                      |
|                      | No burning of waste will be permitted on any site.   |                |                      |
| <b>Sanitation</b>    | The Contractor is to ensure that suitable toilets are provided, however, these cannot be located within 50 m of a watercourse.   |                |                      |
|                      | The Contractor is to advise all staff and sub-contractors that the use of the surrounding environment for urination or defecation is strictly prohibited.  |                |                      |

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| Wastewater           | Water containing waste must not be discharged into the natural environment. Measures to contain the water containing waste and safely dispose of it must be implemented. |                |                      |

### 6.1.12 Water Management

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| Water Management     | All recommendations contained within the Geohydrological study ( <b>Appendix B</b> ) entitled <i>Final Report on the Drilling, Pump Testing and water Quality Analysis of Two (2) New Boreholes in the Ozwathini and Nhlagakazi Areas in the Ilembe District Municipality</i> , undertaken by the Geomeasure Group cc (dated 10 April 2015), must be adhered to. | Contractor     | Monthly              |
|                      | To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Developer for approval and must include the location and design criteria of any temporary stream crossings (siting and return period, etc.)     |                |                      |
|                      | During site establishment, stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Engineer. Suitable stormwater controls must be implemented to prevent the ponding of water on site.   |                |                      |
|                      | After construction, the site must be contoured to ensure free flow of run-off and to prevent ponding of water.   |                |                      |

### 6.1.13 Protection of Fauna and Flora

| Environmental Aspect  | Environmental Measures and Action Plans  | Responsibility  | Monitoring Frequency             |
|---|--|-----------------|----------------------------------|
| Fauna and Flora   | It is required that the pipeline alignment be directly surveyed by a qualified vegetation specialist and relevant plants demarcated, or if relocation / removal is required, obtain approval from the provincial authority prior to relocation / removal thereof. This includes so-called <i>Orange List</i> species (i.e. species of provincial importance) that may be present within the proposed reticulation alignment. | Developer/ECO   | Once-off (prior to construction) |
|   | No vegetation may be cleared without prior permission from the Developer / EO / ECO.   | Contractor/ ECO | Monthly                          |
|   | Trees that are not to be cleared must be marked beforehand with danger tape. The ECO must be given a chance to mark vegetation that is to be conserved before the Contractor begins clearing the site.   |                 |                                  |
|   | No animals must be intentionally killed or destroyed and poaching and hunting must not be permitted on the site.   |                 |                                  |
|   | Disturbance to birds, animals and reptiles and their habitats must be minimised wherever possible.   |                 |                                  |
|   | No large trees are to be removed, cut or pruned for any construction activities, unless they are classified as an invader species or are part of the approved removal and transplanting program.   |                 |                                  |
|   | The Contractor must ensure that all remaining indigenous tree species (dead and alive) and shrubs are retained wherever possible.  |                 |                                  |
|   | Trees and shrubs to be conserved must be clearly marked and demarcation must remain in place for the duration of construction.   |                 |                                  |
| The Contractor must have the necessary knowledge to be able to identify indigenous tree species. The Contractor must also be able to identify declared weeds and alien species that must be totally eradicated. |  |                 |                                  |

| Environmental Aspect      | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|---------------------------|--|----------------|----------------------|
| <b>Sensitive Habitats</b> | Areas which are identified by the Developer or the ECO as being ecologically sensitive are to be suitably demarcated to prevent damage by plant equipment and labour. Temporary shade cloth type fencing (with adequate support to prevent slumping or sagging) must be used and must be moved in phases as the construction progresses from one area to the next. |                |                      |

### 6.1.14 Public and Workforce Safety

| Environmental Aspect               | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|------------------------------------|--|----------------|----------------------|
| <b>Public and Workforce Safety</b> | Dedicated pathways (temporary) for pedestrians must be developed to ensure safe passage around construction activities.  | Contractor     | Monthly              |
|                                    | The dangers associated with construction site entry and exit points and public access must be given special consideration.   |                |                      |
|                                    | All construction workers handling chemical or hazardous substances must be trained in the use of such substances and the environmental, health and safety consequences of incidents. |                |                      |

### 6.1.15 Social Impacts

| Environmental Aspect  | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|-----------------------|--|----------------|----------------------|
| <b>Social Impacts</b> | Disruption of access for local residents must be minimised and must have the Developer's permission.   | Contractor     | Monthly              |
|                       | The Contractor is to inform neighbours of disruptive activities at least 24 hours beforehand. This can take place by way of posters placed in appropriate positions giving the Developer's and Contractor's details, by way of notice in the local newspaper, direct letter-drop to nearby properties, or, any other method approved by the Developer. |                |                      |
|                       | Local communities or local community organisations must be given preference in supplying services and labour to the construction activities. A roster of "temporary labour" must be kept indicating "origin" of employee.  |                |                      |

## 6.2 Construction Phase

### 6.2.1 Administrative and Legal Requirements

| Environmental Aspect   | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|--|--|----------------|----------------------|
| <b>Roles and Responsibilities for Environmental Management</b> | <b>Refer to Section 6.1.1</b>  | SEO            | Daily                |
|  | In addition, the SEO must provide evidence to the ECO that the EMPr is being implemented and adhered to (either through inspections sheets or audit reports) |                |                      |
| <b>Compliance</b>  | <b>Refer to Section 6.1.1</b>  |                |                      |

|   |   |           |  |
|---|---|-----------|--|
| <b>Environmental Training / Induction</b> | <b>Refer to Section 6.1.1</b>   |           |  |
| <b>Review</b>                             | The ECO and EO must consult and review implementation progress as well as discuss and resolve inter alia environmental concerns, non-compliance (including environmental incidents) and I&AP issues raised. | ECO / SEO |  |

### 6.2.2 Site Establishment

| Environmental Aspect      | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|---------------------------|---|----------------|----------------------|
| <b>Site Establishment</b> | <b>Refer to Section 6.1.4</b><br>All areas disturbed outside of the demarcated areas or without permission of the Site Environmental Officer, ECO and Engineer will be subject to a fine.   | Contractor     | Once Off             |
|                           | All construction activities must be strictly limited to the construction area. As far as possible the existing road network must be utilised. Should temporary roads or access routes be necessary and unavoidable, proper planning must take place and the site sensitivity plan must be taken into consideration. No new access roads may be constructed without permission of the Site Environmental Officer, ECO and Engineer.  |                |                      |
|                           | Unauthorised stockpiling, dumping or storage of equipment or materials must not be strictly prohibited within the demarcated “no-go” areas.   |                |                      |
| <b>Sanitation</b>         | <b>Refer to Section 6.1.4</b><br>Chemical toilets are to be maintained in a clean state and must be moved to ensure that they adequately service the work areas<br>The construction of “long drop” toilets is forbidden.<br>Under no circumstances may open areas or the surrounding bush be used as a toilet facility.<br>Bins should have liner bags for efficient control and safe disposal of waste. Safe Disposal Certificates (SDCs) must be obtained.<br>The Contractor must ensure that all litter is collected from the work and camp areas daily.<br>Bins and/or skips must be emptied regularly and waste must be disposed of at a registered landfill site. Waybills for all such disposals are to be kept by the Contractor for review by the Engineer / Site Environmental Officer / ECO.<br>A registered chemical waste company is to be used to remove waste from chemical toilets on site. | Contractor     | On-going             |

### 6.2.3 Equipment, Vehicle Maintenance Yard and Secured Storage Areas (if required)

| Environmental Aspect                   | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|--|---|----------------|----------------------|
| <b>Equipment, vehicles and storage</b> | <b>Refer to Section 6.1.5</b><br>Note that vehicle maintenance must not take place on the site. If emergency repairs are required to vehicles or construction plant then the Contractor must provide adequate ground protection in order to prevent spillages. All maintenance vehicles must be provided with spill kit.<br>Fire prevention facilities must be present at all storage facilities.<br>Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. | Contractor     | On-going             |

| Environmental Aspect                          | Environmental Measures and Action Plans   | Responsibility    | Monitoring Frequency |
|---|---|-------------------|----------------------|
|   | <p>Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.</p> <p>An oil balance must be implemented to demonstrate appropriate management of hydrocarbons.</p> <p>Plant and equipment must be adequately maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.</p> <p>Plant and equipment must be checked on a daily basis for leaks.<br/>If leaks are detected, the plant or equipment must be removed from service immediately and repaired.<br/>If repairs cannot be adequately achieved, the plant or equipment must be removed from service and replaced with plant or equipment that is in good working order (i.e. without any leaks).</p> <p>Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste oils and greases.<br/>All used oils, grease or hydraulic fluids must be placed therein and these receptacles must be removed from the construction camps on a regular basis for recycling.</p> <p>A procedure for the management of oils spills must be introduced. This must address the cleaning of spillage from hard surfaces, utilising environmental friendly cleaning materials as well as the removal and disposal of polluted sand.</p> <p>Fuel must be stored in tanks with lids, which will be kept firmly shut and under lock and key at all times, within a secondary containment facility.</p> <p>Fuel decanting and refuelling must take place within the construction camp. 50 kg of hydrocarbon absorbent to be placed at the construction camp.</p> <p>No smoking must be allowed in the vicinity of storage or dispensing areas.</p> |                   |                      |
| <p><b>Handling of Hazardous Materials</b></p> | <p>All concrete mixing must take place on a designated, impermeable surface.</p> <p>No vehicles transporting concrete to the site may be washed on site.</p> <p>No vehicles transporting, placing or compacting asphalt or any other bituminous product may be washed on site.</p> <p>Lime and other powders must not be mixed during excessively windy conditions.</p> <p>All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.</p> <p>Hazardous substances / materials are to be transported in sealed containers or bags.</p>  | <p>Contractor</p> | <p>On-going</p>      |

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| <b>Spillages</b>     | <p>It is important that any significant spillages of chemicals, fuels, etc. during the construction phase are reported to this office and other relevant authorities. In the event of a spill, the following steps can be taken:</p> <ol style="list-style-type: none"> <li>Stop the source of the spill</li> <li>Contain the spill</li> <li>All significant spills must be reported to this Department and other relevant authorities</li> <li>Remove the spilled product for treatment or authorised disposal</li> <li>Determine if there is any soil, groundwater or other environmental impact</li> <li>If necessary, remedial action must be taken in consultation with this Department</li> <li>Incident must be documented</li> </ol> | Contractor     | On-going             |

#### 6.2.4 *Stockpile Management*

| Environmental Aspect        | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|-----------------------------|--|----------------|----------------------|
| <b>Stockpile Management</b> | Topsoil stripping width must be restricted to the pipeline trench (1.5–2 m) and appropriately stored for later use in rehabilitation. Sub-soil and topsoil (i.e. top ± 30–50 cm of the soil) must be stored separately.  | Contractor     | Monthly              |
|                             | If stockpiles are exposed to windy conditions or heavy rain, they must be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. |                |                      |
|                             | Stockpiles must not exceed 1 m in height unless otherwise permitted by the Developer.  |                |                      |
|                             | Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.   |                |                      |

#### 6.2.5 *Fire Management*

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| <b>Fires</b>         | No open fires or uncontrolled fires must be permitted on site. Open fires for cooking / heating purposes must be strictly prohibited.  | Contractor     | On-going             |
|                      | The contractor must ensure that adequate fire-fighting equipment (i.e. fire extinguishers and existing fire hydrants) is present on the site all times and in good working order.                            |                |                      |
|                      | The workforce must be made aware of fire prevention and fire fighting measures.  |                |                      |
|                      | Any flammable material must be stored in areas where it does not present a fire hazard to surrounding vegetation and people. This includes bitumen, thinning agents, petrol, LPG containers, fuels and oils. |                |                      |

#### 6.2.6 *Stormwater Management*

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| <b>Stormwater</b>    | Sandbag berms must be placed at regular intervals on all steep slopes on the trench line before and after backfilling in order to minimise erosion and subsequent contamination of the stormwater run-off into water courses. | Contractor     | On-going             |



| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
|                      | <p>When the trench line runs across sloping ground, the topsoil excavated from the trench must be stored on the down-slope side of the trench and the sub-soil on the up-slope side.</p> <p>This is important for two reasons, firstly, the larger volume of soil is stored upslope of the trench so that if soil fines and silt are washed off the stockpile during rainfall events, these are washed into the trench and not into a water course, and secondly, it is important to separate the two so that the topsoil is placed on top of the subsoil when the trench is backfilled.</p> <p>This is essential to promote rapid growth of vegetation during the rehabilitation phase.</p>   |                |                      |
|                      | <p>Newly excavated pipeline trenches on steep slopes must have sandbag berms placed on either side of the trench line radiating out from the soil stockpiles at 10 m intervals.</p> <p>The berms must point very slightly downhill to prevent stormwater build up.</p> <p>These berms will greatly reduce the volume of stormwater polluted with silt and soil fines which could impact on rivers and streams below the pipelines and will minimise erosion of bare areas.</p> <p>Silt and soil fines that build up on the inside of these berms must be removed and placed back on the soil stockpiles.</p> <p>Stone packs should be placed at the discharge points at the ends of these berms to prevent erosion if necessary.</p> |                |                      |
|                      | <p>Once the trenches have been backfilled and the soil compacted, sandbag berms must be placed across the trench lines at 10 m intervals. Berms must be angled just off 90° to the slope to prevent the build-up of stormwater on the inside of the berm.</p> <p>Wattle or Gum Poles must be pegged in place between the berms to further slowdown the flow of stormwater. The poles must be at least 130 mm in diameter.</p> <p>The berms will minimise erosion and pollution and will contribute to vegetation growth in a shorter time frame.</p> <p>Stone packs should be placed at the ends of the berms to prevent erosion at discharge points if necessary.</p>   |                |                      |
|                      | <p>Standpipes are often a source of soil erosion hence concrete surrounds (apron) must be provided for each standpipe and the area where the water runs-off covered in a stone pack.</p>   |                |                      |
|                      | <p>At stream and river crossing points the construction area must be isolated by a sandbag bund in order to protect the area from possible silt contaminated run-off.</p>  |                |                      |
|                      | <p>Suitable erosion control measures must be implemented at stormwater discharge points, exposed areas and embankments.</p> <p>These measures could include:</p> <ul style="list-style-type: none"> <li>▪ The suitable use of sand bags or soil saver;</li> <li>▪ The prompt rehabilitation of exposed embankment areas with indigenous vegetation; and</li> <li>▪ The removal of vegetation, only as it becomes necessary for work to proceed.</li> </ul>   |                |                      |
|                      | <p>Over-wetting, saturation and unnecessary run-off during dust control activities and irrigation must be avoided.</p>   |                |                      |
|                      | <p>Surface water and stormwater must be minimised and not allowed to flow down cut or fill slopes or along pipeline routes without erosion protection measures, as previously discussed, being in place.</p>   |                |                      |
|                      | <p>All overflow and scours channels shall be lined with stone pitching along their length and at their points of discharge to prevent soil erosion. The point of discharge must be at a point where there is dense natural grass cover, or if not possible must be suitable dispersed so as to minimise potential erosion and siltation.</p>   |                |                      |
|                      | <p>Channels shall not discharge straight down the contours. These must be aligned at such an angle to the contours that they have the least</p>  |                |                      |

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
|                      | possible gradient.   |                |                      |
|                      | All run-off must be collected and channelled to discharge via surface spreaders into drainage lines.   |                |                      |
|                      | Upon completion of backfilling, sandbag berms must be placed across the bare area created by the trench line. These berms must be angled just off 90°.   |                |                      |
|                      | The intention is to have a minimum distance of open trench with stockpiled soils exposed to rainfall and storm water flow at any one time. It is essential that construction and rehabilitation is completed as quickly as is reasonably possible. |                |                      |

### 6.2.7 Pollution Control Measures

| Environmental Aspect   | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|--|--|----------------|----------------------|
| Pollution Control Measures   | <b>Refer to Section 6.1.10</b>   | Contractor     | On-going             |
|  | Material Safety Data Sheets (MSDSs) for on-site chemicals, hydrocarbon materials and / or waste and hazardous substances must be readily available.  |                |                      |
|  | MSDSs must include information pertaining to environmental impacts and measures to minimise and mitigate against any potential environmental impacts which may result from an incident.  |                |                      |
|  | Static tanks containing fuel, oil, grease or bituminous material must be confined to the construction camp until required.   |                |                      |
|  | These containment facilities must be checked and maintained at all times.  |                |                      |
|  | Rain water collected within these containment facilities can be released, if not contaminated. If the contents of containment facilities are contaminated, the material must be removed and disposed of as hazardous waste.  |                |                      |
|  | The contractor must exercise suitable precautions with the storage, handling and transport of all materials that could adversely affect the environment. If pollution of any surface or groundwater occurs, it must immediately be reported in accordance with the incident reporting and communication procedure and appropriate mitigation measures must be employed.  |                |                      |
|  | In the case of a spill of hydrocarbons, chemicals or bituminous material in the contractor's camp or at the construction sites, the spill must to be contained and the material together with any contaminated soil / sand collected and disposed of as hazardous waste.   |                |                      |
| Should a pollution incident occur on site the Site Environmental Officer and ECO must: |  | SEO / ECO      | On incident          |
|  | <ul style="list-style-type: none"> <li>i. Ensure the immediate implementation of reasonable measures to contain and minimise the impacts of the incident;</li> <li>ii. Notify all persons as per the procedure;</li> <li>iii. Undertake clean up procedures immediately;</li> <li>iv. Record the incident in the Environmental Incident Register; and</li> <li>v. Implement measures to prevent similar incidents from occurring in the future.</li> </ul> |                |                      |

## 6.2.8 Solid Waste Management

| Environmental Aspect   | Environmental Measures and Action Plans   | Responsibility   | Monitoring Frequency |
|--|---|------------------|----------------------|
| General Waste  | The waste management strategy will be agreed to with the Site Environmental Officer and ECO, and will include, but is not limited to, the re-use and recycling of any solid waste generated in construction activities.   | Contractor       | Weekly               |
|  | Recyclable waste must be separated, reused and recycled at approved facilities. Proof must be available.  |                  |                      |
|  | Different waste bins, for different waste streams, must be provided to ensure correct waste separation.   |                  |                      |
|  | All non-recyclable solid waste must be disposed of at a permitted landfill site, and proof must be available and presented to the ECO at the monthly site visits.   |                  |                      |
|  | No building rubble must be used for any infilling work.   |                  |                      |
|  | Littering must be prohibited and dumping of any waste must not be allowed in undeveloped or open areas.   |                  |                      |
|  | No waste material must be burned, buried in the sand or disposed of in any area that is not a licensed landfill site.   |                  |                      |
|  | General waste produced on site may include: <ul style="list-style-type: none"> <li>i. Office waste (e.g. paper, plastic);</li> <li>ii. Operational waste (geofabric material, wood);</li> <li>iii. Building rubble; and</li> <li>iv. General domestic waste (food, cardboards, paper, bottles, tins).</li> </ul>  |                  |                      |
|  | An adequate number of general waste receptacles must be available at the contractor's camp and on site to collect waste from restoration activities and employees and to prevent littering.   |                  |                      |
|  | All general waste must be removed from the restoration areas on a daily basis and disposed of in suitable waste receptacles at the contractor's camp.   |                  |                      |
| Bins must be clearly marked and lined for efficient control and safe disposal of waste.  |   |                  |                      |
| Safe Disposal Certificates (SDCs) must be obtained when waste is moved to landfill.  |   |                  |                      |
| Hazardous waste must not to be mixed or combined with general waste earmarked for recycling or disposal at a licensed landfill site. |   |                  |                      |
| Sewage / Waste Water and Infrastructure  | Waste bins must be cleaned out on a regular basis to prevent any windblown waste and/or visual or odour disturbance.  | Contractor       |                      |
|  | Discharge of waste from temporary chemical toilets into the environment must be strictly prohibited.  |                  |                      |
| Hazardous Waste  | Hazardous waste produced on site may include: <ul style="list-style-type: none"> <li>i. Oil and other lubricants, diesel, paints and solvent;</li> <li>ii. Containers that contained chemicals, oils or greases; and</li> <li>iii. Equipment, steel, other material (rags), soils and water contaminated by hazardous substances (oil, fuel, grease or chemicals).</li> </ul> | Contractor       |                      |
|  | Mixing / decanting of all chemicals / hazardous substances must take place either on a tray / container with an impermeable surface.  |                  |                      |
|  | Hazardous waste is to be disposed at a Permitted Hazardous Waste Landfill Site. The contractor must provide proof of disposal.  | Contractor / ECO |                      |
|  | Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or  | Contractor       |                      |

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
|                      | the top of the container must be covered with a lid).<br>It may be feasible for the waste to be transported to a central point where it can be collected in bulk by the waste disposal company.<br>It must however be noted that:<br>i. Transport of hazardous materials must be done in accordance with legislative control; and<br>ii. Relevant SABS Codes of Practice must be adhered to. |                |                      |

### 6.2.9 Erosion and Sedimentation Management

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| Erosion              | Soil / sand erosion through contractor activities must be prevented.<br>Edge effects of activities, particularly of erosion, need to be strictly managed and addressed immediately.   | Contractor     | Weekly               |
|                      | Suitable erosion control measures must be implemented in areas sensitive to erosion i.e. stormwater discharge points and embankments.<br>These measures could include:<br>i. The suitable use of sand bags, soil saver (hessian curtains or jute matting), or berms;<br>ii. The prompt rehabilitation of exposed sand / embankment areas (with indigenous vegetation for example where appropriate);<br>iii. The removal of vegetation, only as it becomes necessary for work to proceed;<br>iv. Preventing the unnecessary removal of vegetation especially on steep areas; or<br>v. Taking necessary precautions in terms of design, construction and earthworks. |                |                      |
|                      | The time that stripped areas are left open to exposure must be minimised wherever possible.<br>Care must be taken to ensure that lead times are not excessive.  | Contractor     |                      |
|                      | Wind screening and stormwater control must be undertaken to prevent soil loss from the site.<br>Stormwater must be diverted away from areas particularly susceptible to erosion.  |                |                      |
|                      | Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase. I.e. topsoil is to be conserved while providing access to the site and setting up the camp.  |                |                      |
|                      | Should the importation of sand from external sources commercial sources be required, these must only be obtained from licensed sand winning operators. Proof of license must be obtained for auditing purposes.   |                |                      |
|                      | Any sand made available from external sources for restoration work must be approved by the Site Environmental Officer and ECO, in consultation with a specialist, prior to acceptance of delivery by the contractor. Under no circumstances must red soil be used.  |                |                      |
|                      | The stormwater management plan ( <b>Appendix C</b> ) must be adhered to at all times.   |                |                      |

## 6.2.10 Water Management

| Environmental Aspect   | Environmental Measures and Action Plans  | Responsibility   | Monitoring Frequency |
|--|--|------------------|----------------------|
| <b>Stormwater</b>  | Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.<br>Install erosion berms during construction to prevent gully formation.<br>Construct berms: <ul style="list-style-type: none"> <li>i. every 50 m where any disturbed soils have a slope of less than 2%,</li> <li>ii. every 25 m where the track slopes between 2% and 10%,</li> <li>iii. every 20 m where the track slopes between 10% and 15%, and</li> <li>iv. every 10 m where the track slope is greater than 15%;</li> </ul> | Contractor       | On-going             |
|  | Sheet run-off from access roads must be slowed down by the strategic placement of berms and sandbags.  |                  |                      |
|  | Stormwater pipelines must be consolidated where possible to reduce the number of discharge points within an area.  |                  |                      |
|  | Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site, i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.  | Contractor / ECO |                      |
|  | There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed  | Contractor       |                      |
|  | The stormwater management plan must be adhered to at all times.  |                  |                      |
| <b>Water Quality</b>   | Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.   | Contractor       |                      |
|  | Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimise pollution risk and reduced bunding capacity.  |                  |                      |
|  | A designated, bunded area is to be set aside for vehicle washing and maintenance.<br>Materials caught in this bunded area must be disposed of to a suitable waste site or as directed by the Developer.  |                  |                      |
|  | Provision must be made during set up for all polluted run-off to be treated to the Developer's approval before being discharged into the stormwater system.  |                  |                      |
|  | Washing of clothes, equipment or machinery within any watercourse is prohibited.   |                  |                      |
|  | Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these must then be disposed of to a suitable waste site.  |                  |                      |
|  | Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.  |                  |                      |
|  | Care must be taken to ensure that run-off from vehicle or plant washing does not enter the ground water. Wash water must be passed through a hydrocarbon-removing trap prior to being discharged as effluent to a regular municipal sewer.   |                  |                      |
| Site staff must not be permitted to use the sea, any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Developer) must instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. |  |                  |                      |

| Environmental Aspect  | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|---|--|----------------|----------------------|
| <b>Wetland and Riparian Zone Management</b>   | <p>It is understood that due to space constraints the construction activities may need to extend into the area of residual hydromorphic soils, however it is recommended that the construction servitude (right of way) be kept as narrow as possible.</p> <p>The Contractor must maintain a construction servitude no wider than 10 m on either side of the centre line (i.e. 20 m total width of servitude), unless working in areas of high sensitivity, in which case a 5 m servitude on either side of the centre line (i.e. 10 m total width of servitude) must be maintained.</p> | Contractor     | On-going             |
|   | <p>The boundaries of footprint areas are to be clearly defined and it must be ensured that all activities remain within defined footprint areas. Temporary shade cloth type fencing (with adequate support to prevent slumping or sagging) must be used and must be moved in phases as the construction progresses from one area to the next.</p>  |                |                      |
|   | <p>All construction footprint areas must remain as small as possible and should as far as possible not encroach into surrounding more sensitive areas. It must be ensured that the riparian and drainage line systems, and their associated buffer zones are off-limits to construction vehicles and personnel, unless they are to be crossed, then the area of works must be demarcated using pegs / shade cloth to define the works area.</p>  |                |                      |
|   | <p>Any areas where bank failure is observed, resulting from pipeline infrastructure, must be immediately repaired.</p>   |                |                      |
|   | <p>The duration of impacts on the riverine and perennial drainage line systems must be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation take place is minimised.</p>  |                |                      |
|   | <p>No stockpiling of any material can occur in the area of residual hydromorphic soils; if this is unavoidable the ground underneath the stockpile must be lined with a geotextile or similar material.</p>  |                |                      |
|   | <p>Measures must be put in place to ensure that no silt from any stockpiles placed adjacent to the area of residual hydromorphic soils can enter the area of hydromorphic soils (e.g. soil berms, silt fences, etc.).</p>  |                |                      |
|   | <p>No construction activities must take place within the 30 m buffer zone of the sensitive surface water features on the site (<b>Figure 1-2</b>).</p>   |                |                      |
|   | <p>No storage of any hazardous material must be placed within 50 m of the boundary of the area of residual hydromorphic soils, or within 50 m of any wetland area or the edge of any riparian zone.</p>  |                |                      |
|   | <p>No cement batching activities must be conducted within 50 m of the boundary of the area of residual hydromorphic soils.</p>   |                |                      |
|   | <p>No stockpiling must occur within the 30 m buffer zone. If due to space constraints stockpiling of soil or other material needs to occur within a wetland buffer, this must occur as close to the existing road as possible. Methods to prevent material from being washed off the stockpiles and entering the riparian corridor of the river must be put in place (e.g. soil berms).</p>  |                |                      |
|   | <p>A sensitivity map (<b>Figure 1-2</b>) must be considered during all phases of the development and with special mention of the planning of infrastructure, in order to aid in the conservation of and minimise impact on the riparian and aquatic habitat and resources within the area.</p>   |                |                      |
| <p>Should water need to be abstracted from the stream for construction this must only occur if authorised by the DWS.</p> |  |                |                      |

### 6.2.11 Air Quality

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| Air Quality          | Construction sites may become sources of wind generated dust and dust suppression techniques must be implemented when necessary.                          | Contractor     | Monthly              |
|                      | Reasonable speed limits must be maintained at all times in order to prevent accidents, excessive noise and dust and road fatalities of migrating animals. |                |                      |
|                      | No burning of waste, such as plastic bags, cement bags and litter, must be permitted at the contractor or restoration sites.                              |                |                      |
|                      | A complaints register must be provided to report any excessive dust incidents.  |                |                      |

### 6.2.12 Noise

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility   | Monitoring Frequency |
|----------------------|---|------------------|----------------------|
| Noise                | Construction activities must be undertaken according to working hours stipulated by the Developer i.e. during daylight or at night. | Contractor       | On-going             |
|                      | Construction vehicles and equipment generating excessive noise must be fitted with appropriate noise abatement measures.            |                  |                      |
|                      | Construction workers must be provided with the appropriate PPE, i.e. ear plugs.   |                  |                      |
|                      | A complaints register must be provided to record any complaints regarding excessive noise.  |                  |                      |
|                      | All complaints received must be investigated and a response given to the complainant within 14 days.                                | Contractor / ECO |                      |

### 6.2.13 Protection of Fauna and Flora

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| Fauna and Flora      | <b>Refer to Section 6.1.13</b>   | Contractor     | On-going             |
|                      | Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material).                                     |                |                      |
|                      | No natural vegetation is to be collected for use as firewood   |                |                      |
|                      | No animals are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason.  |                |                      |
|                      | A search and rescue must be done for all animals prior to any trenches being established.  |                |                      |
|                      | Fines must be imposed and immediate dismissal on any employee related to the project who is found attempting to snare or otherwise harm faunal species.  |                |                      |
|                      | Workers must be limited to areas under construction within the 10 m pipeline construction servitude on either side, or 5 m on either side within areas of high sensitivity, as outlined in the EMPr. |                |                      |
|                      | Access to the undeveloped areas, especially the relic sandstone sourveld on the edge of the plateau, Scarp forest, rocky cliff, and wooded valleys, must be strictly regulated.                      |                |                      |
|                      | Construction contractors must be fully briefed on the areas which are of higher sensitivity along the pipeline route and in the vicinity of the reservoir.   |                |                      |

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
|                      | Preventative measures to keep the area in the state it was found, must be sought.<br>Re-seeding must be done on disturbed areas especially adjacent to any natural bushveld habitat, riverine or wetland crossing.<br>In accordance with the Conservation of Agricultural Resources Act, Act No. 43 of 1983, slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced.<br>Contour banks must be spaced according to the original or surrounding topography / slope. The type of soil shall also be taken into consideration.<br>Any erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition.<br>The Contractor shall ensure that cleared areas are effectively stabilised to prevent and control erosion<br>A Method Statement for the removal of Alien Invasive Vegetation must be submitted to the ECO for approval. |                |                      |

### 6.2.14 Areas of Specific Importance

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| Archaeological Sites | If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately.   | Contractor     | On event             |
|                      | The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Developer or Site Environmental Officer or ECO of such discovery.  |                |                      |
|                      | Work may only resume once clearance is given in writing by the archaeologist.  |                |                      |
|                      | If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves / middens must be stopped and the Developer or ECO informed of the discovery.<br>Grave / heritage areas are to be marked as 'No-Go' Areas and a 20 m buffer to the graves is to be established.<br>All graves must be accorded the highest level of protection and may not be disturbed without both family consent and a permit from Amafa. |                |                      |
|                      | The project proponent will, in the case of graves, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.  |                |                      |
|                      | No activity is to be undertaken within 50 m to any rock art.   |                |                      |
|                      | Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51(1).  |                |                      |
|                      |  |                |                      |

### 6.2.15 Public and Workforce Safety

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| General              | <b>Refer to Section 6.1.14</b>  | Contractor     | On-going             |
|                      | Construction activities must be undertaken according to working hours stipulated by the Developer i.e. during daylight or at night. |                |                      |



|                |   |  |  |
|----------------|---|--|--|
|                | <p>Flag men must be appointed and provide ample warning of road hazards.</p> <p>All members of the construction workforce working on the site or near the roads must be provided with the appropriate high visibility clothing to ensure that can be seen by motorists.</p> <p>The workforce must be provided with sufficient potable water and under no circumstances are they to use untreated water from local watercourses for drinking.</p> <p>The workforce must be made aware of possible hazards associated with sewage spillage within the areas of restoration work. The workforce must be monitored for ill health associated with exposure to sewage contaminated areas.</p> <p>Care must be taken with electrical connections.<br/>All connections must be treated as live until confirmed otherwise.</p> <p>The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.</p> |  |  |
| <b>Fencing</b> | <p>Confined sites must be fenced and manned to control the access of persons to the site.</p> <p>Potentially hazardous areas such as trenches are to be demarcated and clearly marked.</p>  |  |  |

### 6.2.16 Social Impacts

| Environmental Aspect                             | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|--|--|----------------|----------------------|
| <b>Disruption of Infrastructure and Services</b> | <b>Refer to Section 6.1.15</b>   | Contractor     | On-going             |
|  | Contractor's activities and movement of staff is to be restricted to designated construction areas.  |                |                      |
|  | Should construction staff be approached by members of the public or other stakeholders, they must assist them in locating the Developer or Contractor, or provide a number on which they may contact the Developer or Contractor.                                |                |                      |
|  | The conduct of the construction staff when dealing with the public or other stakeholders must be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Developer. |                |                      |
|  | Disruption of access for local residents must be minimised and must have the Developer's permission.   |                |                      |
| <b>Visual</b>                                    | Storage facilities, elevated tanks and other temporary structures on site must be located such that they have as little visual impact on local residents as possible.  | Contractor     | On-going             |
|  | In areas where the visual environment is particularly important the construction sites may require screening in the form of shade cloth or other suitable materials prior to the beginning of construction.  |                |                      |
|  | Special attention must be given to the screening of highly reflective materials on site.   |                |                      |
|  | Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.  |                |                      |
|  | Lighting on the construction site must be pointed downwards and away from oncoming traffic and nearby houses.  |                |                      |

### 6.2.17 Monitoring, Reporting and Record Keeping

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| <b>Environmental</b> | Environmental monitoring must be undertaken by the Site Environmental Officer on a daily basis and by the ECO on a monthly basis. | SEO / ECO      | As specified         |

| Environmental Aspect                                       | Environmental Measures and Action Plans   | Responsibility         | Monitoring Frequency |
|--|---|------------------------|----------------------|
| <b>Monitoring and Record Keeping</b>                       | This monitoring will be undertaken in order to ensure compliance with all aspects or requirements of the EMPr.  |                        |                      |
|  | The Contractor must provide proof of disposal of building rubble, domestic waste, industrial waste and hazardous waste to licensed waste disposal or recycling facilities.  | Contractor             | As specified         |
|  | The Contractor must provide an oil balance at the monthly ECO visits.   |                        |                      |
|  | The Site Environmental Officer / ECO / Environmental Assessment Practitioner must review and update the EMPr, as required and communicate the changes to the KZN EDTEA Compliance, monitoring and enforcement Acting Assistant Manager, and Contractor.   | ECO / EAP              |                      |
| <b>Complaints register and environmental incident book</b> | Complaints received from the community and other I&APs must be registered and recorded by the Site Environmental Officer and brought to the attention of the ECO and Contractor. All relevant parties must respond accordingly. The following information must be recorded in the case of any complaint/incident: <ul style="list-style-type: none"> <li>i. Time, date and nature of complaint;</li> <li>ii. Response and investigation undertaken; and</li> <li>iii. Corrective and preventative actions taken and by whom.</li> </ul> | SEO / ECO / Contractor | On event             |
|  | All complaints received must be investigated and a response given to the complainant within 14 days.  | ECO / Contractor       | As specified         |
|  | All environmental incidents occurring on the site must be recorded in an Environmental Incident Book.   | SEO / ECO              | On event             |
|  |   |                        |                      |

## 6.2.18 Pollution Control and Emergency Procedures

| Environmental Aspect                              | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|---|---|----------------|----------------------|
| <b>Pollution Control and Emergency Procedures</b> | The Contractor must ensure that relevant pollution control and emergency procedures are developed and the workforce trained on these procedures to ensure that correct actions are followed during pollution or emergency situations. | ECO            | On-going             |
|   | Materials such as fuels, paints and chemicals used in the construction phase must be carefully stored and handled to minimise the risk of spillage into the environment.  | Contractor     |                      |
|   | Any soil contaminated during construction must be removed and disposed of at a licensed disposal site.  |                | On event             |

## 6.3 Rehabilitation Phase

### 6.3.1 General

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| <b>General</b>       | A meeting is to be held on site between the Engineer, Site Environmental Officer, ECO and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer. | Contractor     | On-going             |
|                      | All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer.  |                |                      |
|                      | Once rehabilitation has been carried out, a post-construction audit is to take place to ensure final compliance.  |                |                      |
|                      | The contractor is to rectify any non-compliance found by this audit, prior to vacating the site.  |                |                      |

### 6.3.2 Administrative Requirements

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| Final Payment        | Payment of the final invoice to contractors must not be made until a final inspection by the Site Environmental Officer and ECO is made and it has been confirmed that the work has been completed in accordance with the scope of work and EMPr. | EO / ECO       | On closure           |

### 6.3.3 Site Clean-up

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| Site Clean-up        | Upon completion of the project or decommissioning of the construction camp, the sites must be rehabilitated to the pre-use or determined purpose for the areas.<br>If required, the surface must be ripped and re-vegetated.<br>Any temporary linkages to the water borne sewerage system are to be closed and the area rehabilitated. | Contractor     | Daily                |
|                      | All structures comprising the construction camp are to be removed from site.   |                |                      |
|                      | The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc. and these must be cleaned up.  |                |                      |
|                      | All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area must be top-soiled and re-grassed.  |                |                      |
|                      | The Contractor must arrange the cancellation and removal of all temporary services.  |                |                      |
|                      | All temporary chemical toilets must be removed from the construction camp and be disposed in an appropriate manner.  |                |                      |

### 6.3.4 Vegetation

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
| Vegetation           | Where possible vegetation clearance must be restricted to the actual pipeline trench (1.5–2 m) within the pipeline servitude (10 m, non-sensitive) / 5 m, sensitive).  | Contractor     | On-going             |
|                      | All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation. Edge effects of activities, particularly with regard to alien vegetation, need to be strictly managed and addressed prior to these plants forming seeds. |                |                      |
|                      | Care must be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used. Choice of herbicide must be approved by the ECO prior to use.   |                |                      |
|                      | The Contractor must be in possession of a valid herbicide applicators license or at least be able to prove competence in handling and application of herbicides.   |                |                      |
|                      | Open areas are to be re-planted as per the re-vegetation specification.  |                |                      |
|                      | All vegetation that has been cleared during construction is to be removed from site or used as much as per the re-vegetation   |                |                      |

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
|                      | specification, (except for seeding alien vegetation).<br>The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer. |                |                      |

### 6.3.5 Land Rehabilitation

| Environmental Aspect | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|----------------------|---|----------------|----------------------|
| Land Rehabilitation  | All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.                                     | Contractor     | On-going             |
|                      | All rubble is to be removed from the site to an approved disposal site. Burying of rubble on site is prohibited.                                  |                |                      |
|                      | The site is to be cleared of all litter.  |                |                      |
|                      | Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer. |                |                      |
|                      | All embankments are to be trimmed, shaped and replanted to the satisfaction of the Engineer.  |                |                      |
|                      | The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials                               |                |                      |

### 6.3.6 Material and Infrastructure

| Environmental Aspect        | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|-----------------------------|---|----------------|----------------------|
| Material and Infrastructure | Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. | Contractor     | On closure           |
|                             | All residual stockpiles must be removed to spoil or spread on site as directed by the ECO and the Engineer.   |                |                      |
|                             | All leftover building materials must be returned to the depot or removed from the site.   |                |                      |
|                             | The Contractor must repair any damage that the construction works has caused to neighbouring properties and services.                                 |                |                      |

### 6.3.7 Rehabilitation

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility               | Monitoring Frequency            |
|----------------------|--|------------------------------|---------------------------------|
| Rehabilitation       | The Contractor must refer to and implement the rehabilitation recommendations contained within the document <i>Preliminary Ecological Habitat Assessment for the Proposed Emergency Nondabula Water Reticulation Project (Section 7.4)</i> .<br>Should the Contractor wish to diverge from these recommendations, the ECO must approve a method statement before the Contractor commences with these rehabilitation works. | Developer / ECO / Contractor | Monthly                         |
|                      | Remove all construction material from the pipeline servitude where construction has been completed.  |                              | Once off at end of construction |
|                      | Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.   |                              |                                 |

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility | Monitoring Frequency |
|----------------------|--|----------------|----------------------|
|                      | <p>The naked ground or new pipeline servitude should be seeded with a stabilising grass mix, suited to the conditions. The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed.</p> <p>For slopes:</p> <ul style="list-style-type: none"> <li>• &gt;15°: 25–50 kg/ha; or</li> <li>• &lt;15°: 15–25 kg/ha.</li> </ul> <p>The natural seed bank in the topsoil will supplement the seed mix applied.</p> <p>The seed mix should consist of pioneer grass species of the area, and will also depend on what species are commercially available during the season required. A standard seed mix would consist of the following species (in decreasing order of proportion constituting the seed mix)*:</p> <ul style="list-style-type: none"> <li>• <i>Andropogon chinensis</i></li> <li>• <i>Aristida junciformis</i></li> <li>• <i>Cynodon dactylon</i></li> <li>• <i>Cymbopogon plurinodis</i></li> <li>• <i>Eragrostis gummiflua</i></li> <li>• <i>Themeda triandra</i></li> <li>• <i>Setaria spp.</i></li> <li>• <i>Imperata cylindrica</i></li> <li>• <i>Sporobolus fimbriatus</i></li> </ul> <p>Note that sedges such as <i>Cyperus immensus</i>, <i>Schoenoplectus spp.</i> and <i>Juncus spp.</i> must be used where they have been observed pre-construction.</p> |                |                      |
|                      | <p>The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering is to be done in a manner that ensures that no erosion of the topsoil and seed mix takes place.</p>   |                |                      |
|                      | <p>If the grasses have not established after a period of two months after seeding, the areas should be reseeded. If necessary, another dressing of topsoil must be applied prior to seeding.</p>   |                |                      |
|                      | <p>Slope stabilisation measures may be necessary in places where grass has not been able to establish and there is an erosion risk. The measures implemented depend on the situation, and can be varied as necessary.</p> <p>Various slope stabilisation measures are available and vary in effectiveness according to the situation including</p> <ul style="list-style-type: none"> <li>• Gabion mattresses and baskets adjacent to the non-perennial drainage line.</li> <li>• Logs/bark held in place with pegs</li> <li>• Rows of <i>Cynodon dactylon</i>, <i>Panicum maximum</i>, <i>Imperata cylindrica</i>, <i>Hyparrhenia filipendula</i> held in place with pegs.</li> <li>• Soil and rock sausages along contours.</li> </ul>   |                |                      |

\* see attached species list

| Environmental Aspect | Environmental Measures and Action Plans  | Responsibility               | Monitoring Frequency |
|----------------------|--|------------------------------|----------------------|
|                      | All alien vegetation is to be appropriately removed appropriately and disposed of.<br>Alien species that have been encountered included: Black Wattle ( <i>Acacia mearnsii</i> ), Syringa <i>Melia azedarach</i> , Brazilian Glory Pea or Red Sesbania ( <i>Sesbania punicea</i> ), Castor-Oil Plant ( <i>Ricinus communis</i> ), Lantana ( <i>Lantana camara</i> ), Bugweed ( <i>Solanum mauritianum</i> ), Peanut Butter Cassia ( <i>Senna didymobotrya</i> ), Morning Glory ( <i>Ipomoea purpurea</i> ), Paraffin Bush ( <i>Chromolaena odorata</i> ), Yellow Oleander ( <i>Thevetia peruviana</i> ), Montanoa ( <i>Montanoa hibiscifolia</i> ), Indian Shot ( <i>Canna indica</i> ), <i>Ageratum conyzoides</i> , <i>Caesalpinia decapetala</i> , <i>Campuloclinium macrocephalum</i> , <i>Chromolaena odorata</i> , <i>Ipomoea indica</i> , <i>Leucaena leucocephala</i> , <i>Psidium guajava</i> , <i>Rubus cuneifolius</i> , <i>Rubus fruticosus</i> , <i>Mimosa pigra</i> , and <i>Tithonia diversifolia</i> . |                              |                      |
|                      | All soils compacted as a result of construction activities falling outside of footprint areas must be ripped and profiled to match the pre-construction profile and tie into adjacent areas.   |                              | Daily                |
|                      | All damaged embankments must be shaped to an angle of repose not exceeding 35°, but preferably between 19° and 24°.  |                              | Daily                |
|                      | Embankments must be vegetated with indigenous vegetation as per site instructions.   |                              | Daily                |
|                      | Rehabilitation must consider the use of temporary stabilisation of slopes using geotextiles and installation of gabions and reno mattresses, as per the recommendations from the ECO and/or the Engineer.  |                              | Daily                |
|                      | All established vegetation must be monitored on a monthly basis by the Site Environmental Officer until properly established and appropriate actions must be implemented to address poor establishment as per ECO recommendations. This includes monitoring all areas for erosion and incision, particularly any riparian/wetland crossings. Any areas where erosion is occurring excessively quickly must be rehabilitated as quickly as possible.  |                              | Monthly              |
|                      | Final rehabilitation of Contractor sites must be completed within a period specified by the Developer. Following the date stipulated by the Developer, final sign-off on the rehabilitation works must be given by the ECO.  | Contractor                   | As specified         |
|                      | Wetland rehabilitation must be undertaken as per the recommendations contained within the Wetland Rehabilitation Plan (see <b>Appendix D</b> ).  | Developer / ECO / Contractor | As specified         |

## 6.4 Operational Phase

### 6.4.1 General

| Environmental Aspect                 | Environmental Measures and Action Plans   | Responsibility | Monitoring Frequency |
|--------------------------------------|---|----------------|----------------------|
| General                              | The Emergency Nondabula Water Reticulation project pipeline servitudes must be regularly inspected during the operational phase and alien vegetation that have re-emerged, must be removed and a follow-up treatment applied.   | Developer      | Twice annually       |
| Wetland and Riparian Zone Management | The wetland rehabilitation recommendations contained within the <i>Wetland Ecological Assessment for the Proposed Emergency Nondabula Water Reticulation Project, Ilembe Municipality, KwaZulu-Natal</i> as prepared by Scientific Aquatic Services (June 2015), must be strictly adhered to. See Appendix D. |                |                      |

## 7 Fines and Penalties

Failure to conform to the conditions set out in the EMPr will result in the issuing of fines to the Contractor / Site Manager by the ECO. These fines will be paid by the Contractor and will be used in the rehabilitation or landscaping of the site.

The final amount, however, will be quantified by the Site Manager and the appointed ECO prior to going on site. The values below are thus deemed to be a useful point of departure from which site and task appropriate values can be quantified.

The ECO will notify the Contractor / Site Manager in writing upon issuing a fine. Fines will be issued through the Developer and may be issued either for *significant* non-compliances and/or *repeat* minor non-compliances that are not rectified within thirty (30) days from the date of recording by the ECO (during a site audit or by reliable photographic evidence).

Note that the escalation factor in terms of repeat offences needs to be determined (e.g. doubling to a maximum combined value for a set of activities), and the point at which a repeat offence by the Contractor / Sub-Contractor will result in either of these parties being requested by the ECO to be removed from site by the Developer.

**Table 7-1: Fine system to be implemented**

| Offence  | Amount  |
|--|---------|
| Failure to demarcate working areas   | R10,000 |
| Working outside of demarcated areas  | R30,000 |
| Failure to strip topsoil with intact vegetation                                | R50,000 |
| Failure to stockpile topsoil correctly   | R30,000 |
| Failure to stockpile materials in designated areas                             | R10,000 |
| Failure to take measures to prevent soil contamination                         | R10,000 |
| Failure to take measures to control dust dispersion on site                    | R10,000 |
| Washing of vehicles on site  | R10,000 |
| Pollution of water bodies and/or groundwater                                   | R20,000 |
| Failure to implement stormwater management provisions during construction      | R20,000 |
| Failure to control stormwater runoff   | R30,000 |
| Downstream erosion   | R30,000 |
| Failure to provide adequate sanitation   | R10,000 |
| Failure to erect temporary fences around trenches                              | R10,000 |
| Failure to provide adequate waste disposal facilities and services             | R50,000 |
| Failure to reinstate disturbed areas within the specified time-frame           | R30,000 |
| Illegal hunting activities including trapping, snaring or harming wild animals | R10,000 |
| Any other contravention of the project specific specification                  | R10,000 |

## 8 Declaration of Understanding of the EMPr

A declaration of understanding of the EMPr will be required to be signed by the Developer, Engineers, and Contractors. A sample of this declaration is found below.

**DECLARATION OF UNDERSTANDING  
OF THE  
ENVIRONMENTAL MANAGEMENT PROGRAMME**

I, \_\_\_\_\_ acting  
as Developer / Engineer / Contractor / ECO representing \_\_\_\_\_  
\_\_\_\_\_

declare that I have read and understood the contents of the Environmental Specifications (which include the Environmental Management Programme, the Record of Decision and the Amended Environmental Authorisation, the Project Specifications and this guideline document) for:

Contract \_\_\_\_\_  
\_\_\_\_\_

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: \_\_\_\_\_

Place: \_\_\_\_\_

Date: \_\_\_\_\_

Witness 1: \_\_\_\_\_

Witness2: \_\_\_\_\_