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PRE-CONSTRUCTION, CONSTRUCTION AND POST-CONSTRUCTION PHASE

ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR

The Proposed Expansion of the
Melkhoutfontein Cemetery on Erf RE/566
and Portion 480 of the Farm Melkhout
Fontein Nr. 141 in Still Bay, Western Cape.

APPLICANT:	Hessequa Local Municipality. Contact: Ruschan Manho - Director: Technical Services
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DEA & DP PROJECT REFERENCE:	16/3/3/1/D5/12/0015/20
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DOCUMENT DETAILS

Project Ref. No:	CT23
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Sharples Environmental Services cc Since 1998, SES has been actively engaged in the fields of environmental planning, assessment and management. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. Our consultants have over 20+ years of combined experience and we operate in the Southern, Eastern and Western Cape regions.

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1. Introduction

Sharples Environmental Services cc (SES) has been appointed by Zutari, on behalf of Hessequa Local Municipality, to undertake the Environmental Impact Assessment for the Proposed Expansion of the Melkhoutfontein Cemetery on Erf 566 and Portion 141/480, Hessequa Local Municipality.

2. About this EMPr

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

This EMPr has been prepared in accordance with the requirements of an EMPr as specified in the Environmental Impact Assessment Regulations, 2014 (as amended, 2017), and with reference to the "Guidelines for Environmental Management Programmes" published by the Department of Environmental Affairs and Development Planning (2005).

It is important to note that not only is the EMPr designed to manage the physical establishment of the development *per se*, but also as a tool which can be used to manage the environmental *impacts* of the development.

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

2.1 Important caveat to the report

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

The Implementing Agent and the attitude of the construction team play an integral role in determining the impact that the development will have on the environment. The ECO needs to ensure that all role-players are aware of the constraints that the EMPr places on the development and construction team and are prepared to be actively involved in enforcing these constraints. The end result relies on cooperation and mutual respect and understanding of all parties involved.

3. How to use this document

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

This EMPr must be included in all contracts compiled for contractors and subcontractors employed by the *Hessequa local Municipality*, as this EMPr identifies and specifies the procedures to be followed by

engineers and other contractors to ensure that the adverse impacts of construction and maintenance activities are either avoided or reduced. Appointed contractors must make adequate financial provision to implement the environmental management measures specified in this document.

This EMP must be seen as a working document, which may be amended as and when needed, in order to accommodate changing circumstances on site or in the surrounding environment, or in order to accommodate requests/ conditions issued by the competent authority, the Department of Environmental Affairs & Development Planning (DEADP). Amendments to this EMP must first be approved by the competent authority, in writing, before being implemented.

4. Description of the Activity

The Hessequa Local Municipality proposes to expand the existing Melkhoutfontein cemetery by approximately 8,339.00m² on Portion 480 of the Farm Melkhout Fontein Nr. 141 and the remainder of Erf 566 to accommodate additional burial spaces for the next decade. According to preliminary engineering investigations, the current expansion proposal will be adequate for the next 5 years. (figure 3).

Proposed Scope of Works:

- Demolish wall boundary (eastern and southern side of site) and erect new boundary wall around extension.
- Clear 8 339m² proposed extension on Erf 566 and Erf141/480 (combined).
- Extend existing access road, with gravel/asphalt finish.
- Implement stormwater management design specific to site.
- Rehabilitation with indigenous vegetation and rescued bulbs/cuttings from degraded fynbos.

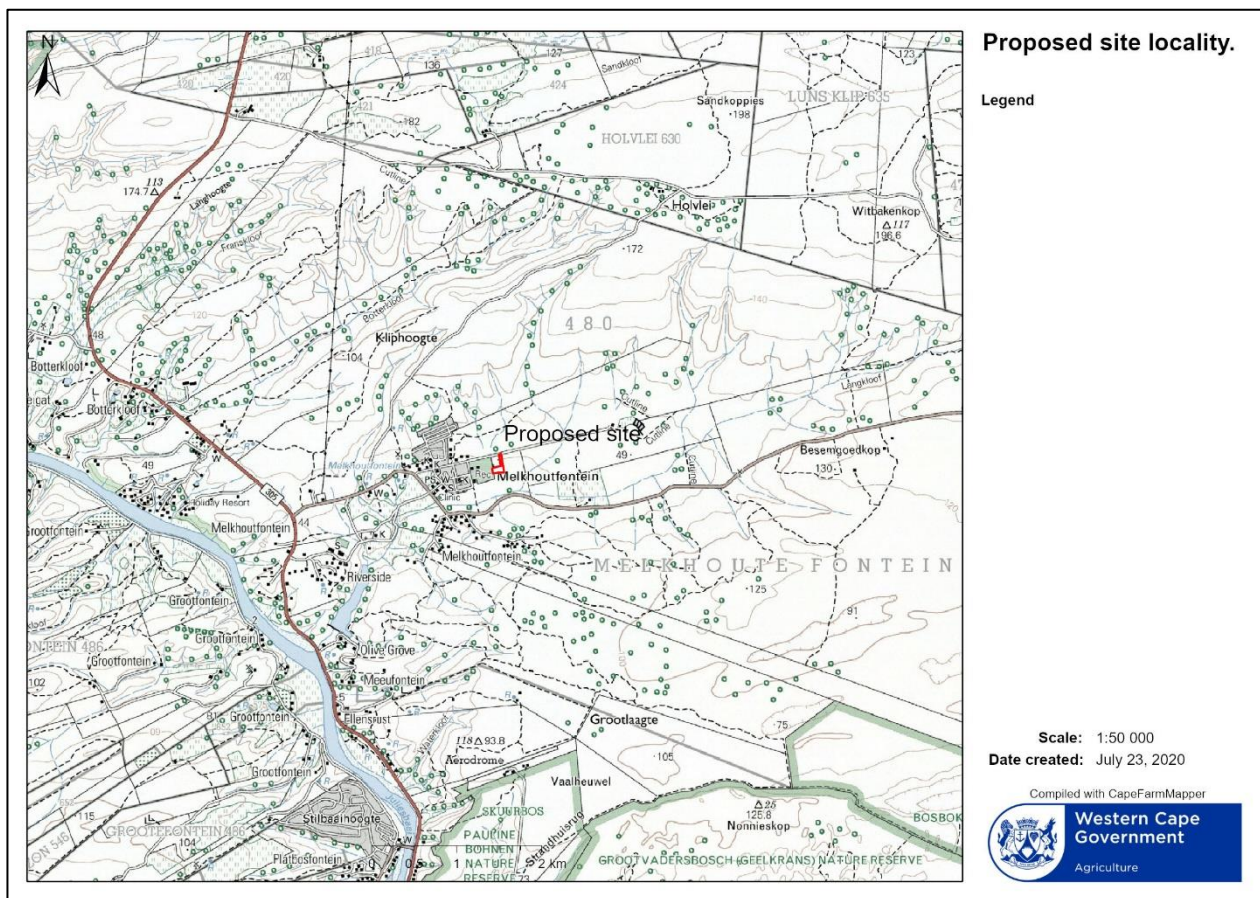


Figure 1: The proposed site for the cemetery extension (red border).

Engineering Details:

A preliminary engineering report was undertaken on September 2018, by Element Consulting Engineers. Zutari is the current consulting engineers and have approved the original preliminary report.

Water Reticulation

The Melkhoutfontein Cemetery is being serviced by the existing municipal water mains supply, via a bulk water main (50mm diameter, FC), with internal reticulation (25mm diameter, uPVC), and taps situated within the site.

The proposal will include the extension of the existing water pipeline, and the placement of new taps, within the new extended area.

- Proposed Length: approximately 65m
- $\phi = 25 - 50\text{mm}$ connection
- Material: uPVC pipelines.
- Class 9 or 12, depending on pressure.
- No fire hydrants are proposed.

The possible peak time demand for the site is approximately 1kl/day at peak times only. The volume of municipal water can easily be decreased or supplemented with rainwater harvesting and tanks for storage at the proposed main gate building/toilets. Element Consulting Engineers have advised that rainwater be used for gardening purposes.

Sewer Reticulation

The existing cemetery does not have an existing ablution facility, however Element Consulting Engineers have advised that there is existing water reticulation located close to the cemetery, therefore an ablution facility can be accommodated at the main gate. As an alternative the Element Consulting Engineers have advised that waterless "Enviro Loo" type of toilets be utilized at the main entrance, which would require no water/sewer reticulation, and while installation is slightly expensive, it is a better alternative in terms of saving on water consumption and minimum maintenance.

Depending on type of ablution facilities agreed on by the Municipality, details are as follows:

1. "Enviro Loo"
 - It is recommended that at least 1, preferably 2 "Enviro Loo" toilets must be provided at the main gate, or
2. Ablution Building
 - Proposed 110mm diameters (minor lines);
 - Proposed 160mm diameters (main lines);
 - uPVC
 - Class 34
 - Proposed pre-casted ring manholes with concrete floor and pre-manufactured concrete lid where indicated.

Roads

The existing access road will be extended to incorporate the new extension of the site. The proposed details are as follows:

- Total Length: approximately $\pm 75\text{m}$
- Access road width: approximately 5m
- Internal road width: 4m
- Material (access road): Gravel/asphalt
- Minimum radii at entry bell mouth (Access road): 8m
- Minimum radii at entry bell mouth (Internal access roads): 5m

- Road design life of 20 years.
- Subgrade material CBR of 15-20.
- Subbase material CBR of minimum 45 (locally sourced).
- 50mm gravel surfacing, or alternatively 30mm asphalt surfacing.
- Minimum road grade of 0.45% and crossfall of 2%.
- Design speed of 20km/h on all roads including main access road.

Stormwater

This has been determined to be critical, due to the flat gradient of the site, that has the potential to result in ponding. It is proposed that an informal stormwater reticulation system will as such be provided by a combination of surfaced roadways, v-channels and cut-off drains, limited inlet structures and concrete stormwater pipes where needed.

The formal internal storm water reticulation system will naturally drain towards, and discharge into the existing open veld or into the existing cemetery stormwater system, if any.

Solid Waste

It has been recommended that solid waste bins be established at the main gate, to be emptied by the municipality.

Electricity

It has been established that the electrical services end at the cemetery boundary. However, Element Consulting Engineers have reported that following minister officials have advised that spare capacity for small consumption areas exists. In the case of Melkhoutfontein Cemetery, electrical supply would only be used for the main gate, a light pole at the main gate and the toilets. It has been envisaged that solar panels with LED lights, will be sufficient to meet the predicted consumption of the cemetery.

The town of Melkhoutfontein is located within the Garden Route District Municipality and is situated about 7km inland from the popular seaside holiday town of Still Bay, accessible off the R305 regional road. Melkhoutfontein was initially established as a fisherman's settlement and has since developed a proud heritage, the town is also known as one of the Southern Cape's hotspots for unstaged, intra-cultural tourism experiences. Erf RE/566 and Portion 480 of the Farm Melkhoutfontein Nr. 141 is situated on the eastern outskirts of the town centre, of Rooipitjieweg road and outside of the delineated urban edge.

It has been determined by the appointed engineers, that the existing grave site at the Melkhoutfontein cemetery currently has 45 burial plots available. The average yearly funerals are approximately 25, leaving the Melkhoutfontein cemetery with a capacity of approximately 18 months thus giving purpose to the urgent expansion of the cemetery. The Municipality have identified vacant land to the east and south on a vacant part of Portion 141/480 (approximate area 5,843.50m²) and to the south on a part of Erf 566 (approximate area 2,495.50 m²) – a total expansion of 8,339.00m².



Figure 2: Proposed expansion of existing cemetery.



Figure 3: Proposed layout plan.

The following is proposed to be developed as per the Site Layout Plans shown in Appendix B and in the table below:

Table 1: Summary Table: Site and Farm Details

Province		Western Cape																					
District Municipality		Garden Route District Municipality																					
Local Municipality		Hessequa Local Municipality																					
Ward number(s)		Ward No 1																					
Nearest town(s)		Still Bay – 7kms																					
SG Code	Melkhoute Fontein 141/480	C0640000000048000141																					
	Erf Re/566	C06400050000056600000																					
Co-ordinate s of the farm boundari es:		<table border="1"> <thead> <tr> <th></th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>34° 19' 25.94"</td> <td>21° 25' 33.52"</td> </tr> <tr> <td>B</td> <td>34° 19' 25.79"</td> <td>21° 25' 34.38"</td> </tr> <tr> <td>C</td> <td>34° 19' 31.66"</td> <td>21° 25' 35.53"</td> </tr> <tr> <td>D</td> <td>34° 19' 31.96"</td> <td>21° 25' 31.22"</td> </tr> <tr> <td>E</td> <td>34° 19' 30.36"</td> <td>21° 25' 30.93"</td> </tr> <tr> <td>F</td> <td>34° 19' 29.51"</td> <td>21° 25' 34.23"</td> </tr> </tbody> </table>		Latitude	Longitude	A	34° 19' 25.94"	21° 25' 33.52"	B	34° 19' 25.79"	21° 25' 34.38"	C	34° 19' 31.66"	21° 25' 35.53"	D	34° 19' 31.96"	21° 25' 31.22"	E	34° 19' 30.36"	21° 25' 30.93"	F	34° 19' 29.51"	21° 25' 34.23"
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	E	34° 19' 30.36"	21° 25' 30.93"																				
F	34° 19' 29.51"	21° 25' 34.23"																					



5. Description of Environmental Setting

5.1 Vegetation

5.1.1 Vegetation description

According to the Vegetation Map of SA (2012) accessed from CapeFarmMapper (October 2020) the vegetation unit primarily affected by the proposed expansion is Canca Limestone Fynbos (Figure 5) which has a Least Threatened (LT) Conservation Status.

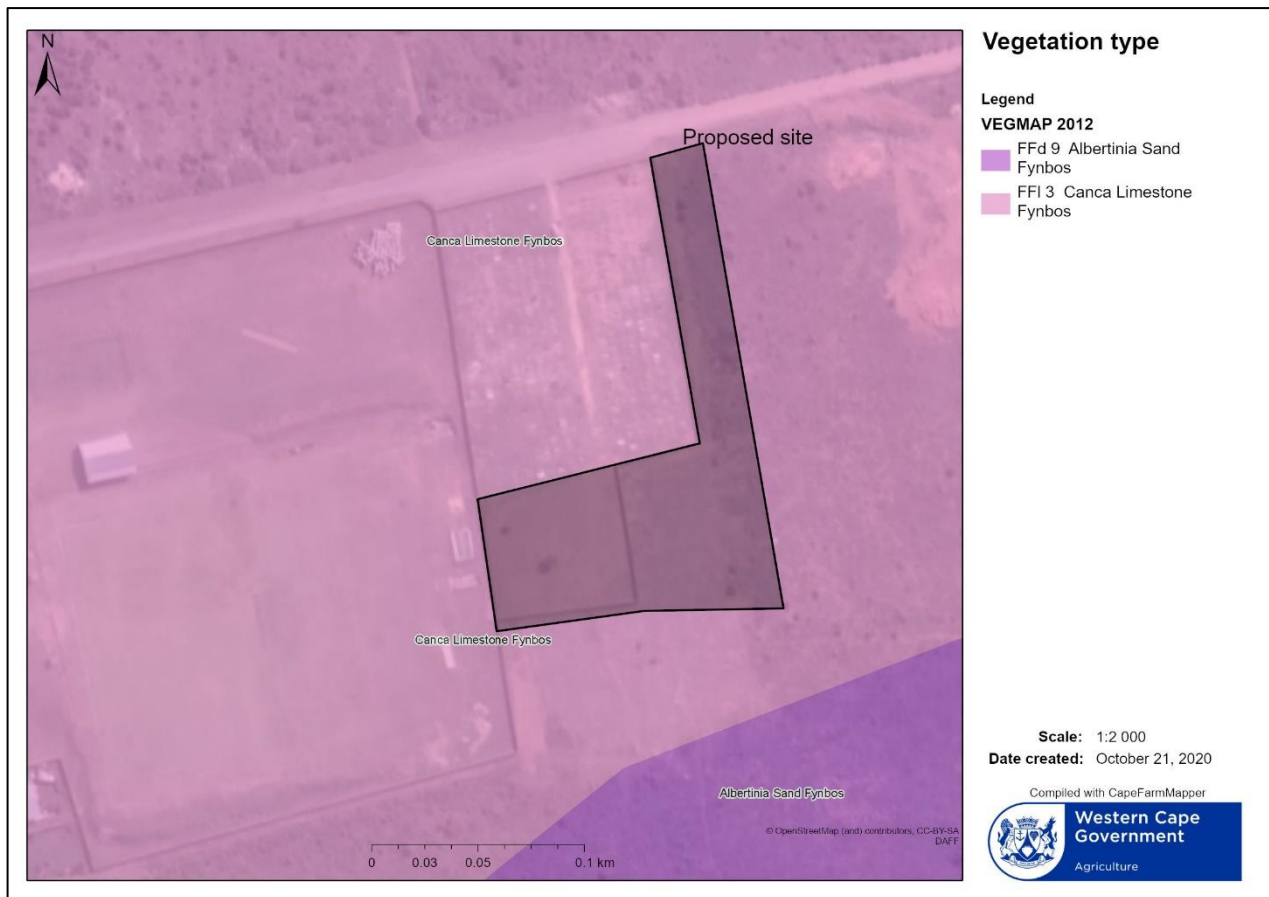


Figure 4: Vegetation Map of SA.

The Botanical Survey completed by Mark Berry Environmental Consultants (2020) notes that due to the sandy substratum encountered on site and the presence of species characteristic to both Albertinia Sand Fynbos (e.g. *Leucospermum praecox* and *Thamnochortus erectus*) and Canca Limestone Fynbos (e.g. *Aspalathus sanguinea*), one can argue that the fynbos on site is transitional between the two types. Having said this, the author noted that the vegetation is degraded and species poor, with certain areas devoid of significant fynbos (see Figure 6 & 7). The disturbance can be attributed to the presence of the adjacent cemetery, earthmoving activities on the eastern side and past agricultural activities. Structurally, it can be described as a low (± 0.8 m) closed (80-90%) small-leaved shrubland following Campbell's (1981) classification. A few scattered *Acacia cyclops* (rooikrans) and single *Leucospermum praecox* (>2 m) are prominent emergent species on site. The disturbed areas are covered by herbaceous weeds/shrubs and grasses.

Indigenous shrub species recorded include *Osteospermum moniliferum*, *Metalasia muricata*, *Seriphium plumosum*, *Helichrysum patulum*, *Chrysocoma ciliata* (dom), *Aspalathus sanguinea*, *Searsia glauca*, *S. laevigata*, *Olea europaea*, *Gymnosporia buxifolia*, *Leucospermum praecox*, *Muraltia spinosa*, *Gnidia squarrosa* (dom), *Passerina corymbosa*, *Asparagus* spp (dom), *Rubia petiolaris*, *Chironia baccifera*, *Tetragonia fruticosa*, *Solanum linnaeanum* and *Withania somnifera*.

Invasive species recorded (albeit in low numbers) include *Acacia cyclops* (rooikrans), *Opuntia ficus-indica* (prickly pear) and *Verbesina encelioides* (wild sunflower) (see Photo 4 above). Rooikrans and prickly pear are listed invasive aliens (Category 1b) in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) Alien and Invasive Species List (2016).



Figure 5: Disturbed north-eastern corner of site

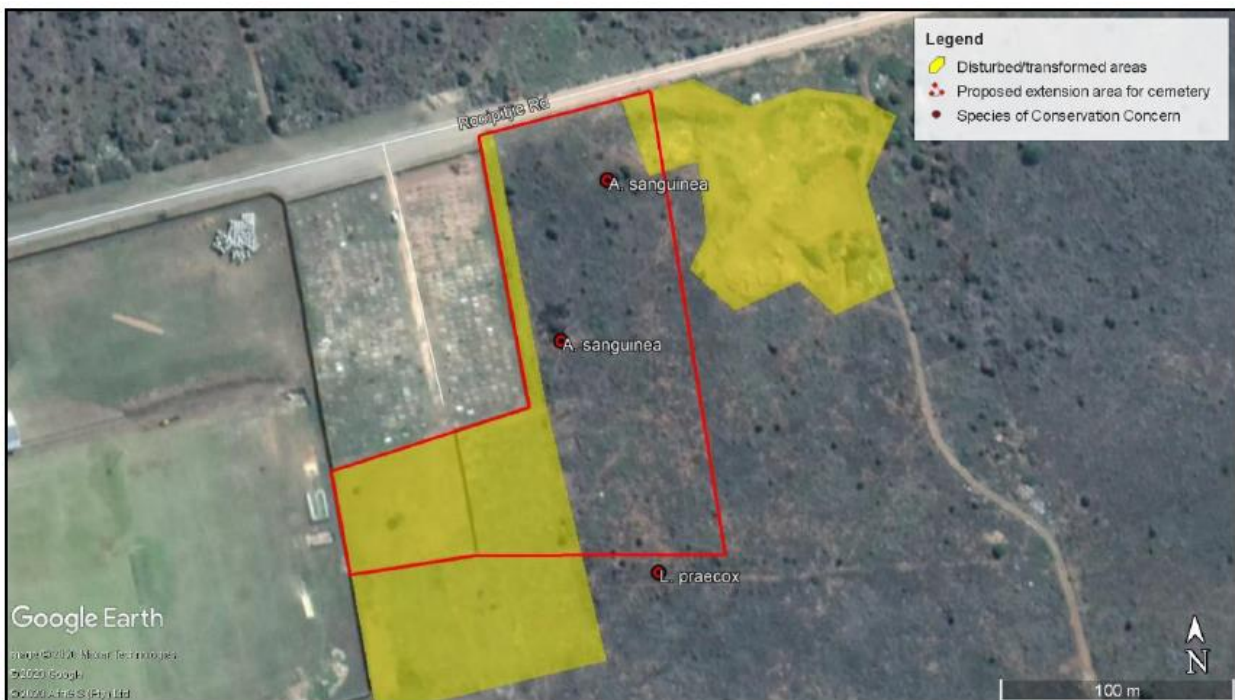


Figure 6: Aerial photograph showing the biodiversity attributes of the site.

The Botanical Survey (2020) notes that two Species of Conservation Concern were recorded (figure 7), namely *Aspalathus sanguinea* (two patches; Near threatened) and *Leucospermum praecox* (a single shrub; Vulnerable). The former was also observed (by the author) on the limestone hill slopes to the northwest. Both are regional endemics. The Botanical specialist has confirmed that the identified Species of Conservation Concern are situated outside of the proposed site (Figure 2).

5.1.2 Botanical Sensitivity

The Botanical Survey completed by Mark Berry Environmental Consultants (2020) notes that the Canca Limestone Fynbos is currently not considered a threatened vegetation type. However, agricultural activities, alien plant infestation and coastal developments remain major threats for certain species restricted to this vegetation type. According to Mucina & Rutherford (2006), 86% of Canca Limestone Fynbos is still left. However, due to its poor conservation status its protection in the coastal areas remains a priority. Less than 1% is formally conserved in the Pauline Bohnen and Geelkrans Nature Reserves (Mucina & Rutherford 2006). *Albertinia* Sand Fynbos, on the other hand, is listed as Vulnerable (DEA 2011). About 57% of it is still left, while 5% is formally protected in De Hoop, Pauline Bohnen, Geelkrans, Kleinjongensfontein, Blomboschfontein and Skulpiesbaai Nature Reserves (DEA 2011). These ratings are reaffirmed in the Western Cape Biodiversity Spatial Plan Handbook (Pool-Stanvliet et al. 2017).

5.1.3 Western Cape Biodiversity Spatial Plan.

The entire site, which falls inside the Hessequa Biodiversity Network, has been mapped as a terrestrial critical biodiversity area (CBA) (see figure 7). It forms part of an extensive biodiversity (CBA) corridor that runs in a west-east direction from the Duiwenhoksrivier (in the west) to the Gourits River (in the east) across the Goukou, linking several nature reserves along the way. Apart from providing a backbone to the local biodiversity network, the corridor serves as an important passage along which fauna can migrate across the lowlands. Reasons for the inclusion of the site and its surrounding area in the CBA network include the presence of threatened vegetation types, a FEPA river corridor and a climate adaptation corridor. The non-

perennial watercourse and associated wetlands to the south of the site have been mapped as an aquatic (river and wetland) CBA. The latter connects again with the Goukou River and its floodplain.



Figure 7: Site in relation to the Western Cape Biodiversity Spatial Plan 2017.

5.1.4 Terrestrial Biodiversity (Butterflies)

A Terrestrial Biodiversity Sensitivity Study (Butterflies) was undertaken by Dave Edge & Associates (2020) to carry out a butterfly sensitivity survey for the expansion of the Melkhoutfontein Cemetery. It was noted by the author that the vegetation is fairly degraded but may still be inhabited by butterfly species that prefer bare sandy ground and sparse vegetation. The Terrestrial Biodiversity Sensitivity Study (Butterflies) (2020) explains that the proposed cemetery development area at Melkhoutfontein was rated as being of “Medium” sensitivity because of the possibility of the occurrence of six butterfly species of conservation concern. The investigation has revealed that three of these species of conservation concern (SCC) could not possibly occur on the site. However, there is a low possibility that one or more of the other three SCCs species could occur on or near the site.

5.2 Freshwater features

5.2.1 The Aquatic Environment

The proposed site is located within the Quaternary Catchment H90E and falls within the Breede-Gouritz Water Management Area. The Freshwater Habitat Impact Assessment completed by Sharples Environmental Services cc (2020) initially conducted a desktop assessment and identified various non perennial river lines, within the 500m Regulated Area, a valley bottom wetland south of the site, and a seep wetland 500 m north of the site. However, infield assessment identified only one watercourse within the study area; a channelled valley bottom wetland situated approximately 200 m south of the proposed site (Figure 9 and 10). There was no evidence of aquatic habitat within or directly surrounding the new cemetery site.



Figure 8: Photograph taken on the proposed cemetery site (upon the hillside) showing the tall reeds of the Melkhoutfontein Wetland, approximately 200 m downslope, on the valley floor.

The Freshwater Habitat Impact Assessment (2020) notes that the Melkhoutfontein Wetland is an un-channelled valley bottom wetland which flows in a diffuse manner along the shallow valley floor towards the Goukou River in the west. The sediment source responsible for the formation of the wetland is alluvial in nature and depositional processes presently dominate the geomorphic dynamics of the system. The longitudinal slope of the wetland upon the plateau is gentle and incision is controlled by the dam in the lower reach which acts as a local base level. The valley cross section is relatively flat, and although localised channels may form within vegetation, there is a lack of channel development within the wetland. The dominant water inputs are sourced from lateral and longitudinal groundwater seepage which sustains flows such that the wetland remains wet for long periods. Therefore, it can be described as a permanent wetland with seasonal and temporary zones located in a narrow area laterally. It is characterised by low velocity, diffuse flow patterns, within a well-vegetated habitat.

The wetland vegetation, except for a small portion at its source, is dominated by dense reed beds of *Phragmites australis*. Although considered a native species in southern Africa, it grows to form tall monospecific stands, which can outcompete other wetland plant species (Canavan *et al.*, 2018). This results in the plant often being viewed as a threat to biodiversity and a physical nuisance to landowners/communities. *Phragmites australis* tolerates various environmental conditions and has the ability to withstand significant habitat disturbance. Therefore, it often establishes and thrives in disturbed wetlands (with high nutrient and sediment inputs) in which other wetland species struggle to withstand (Massacci *et al.*, 2001).

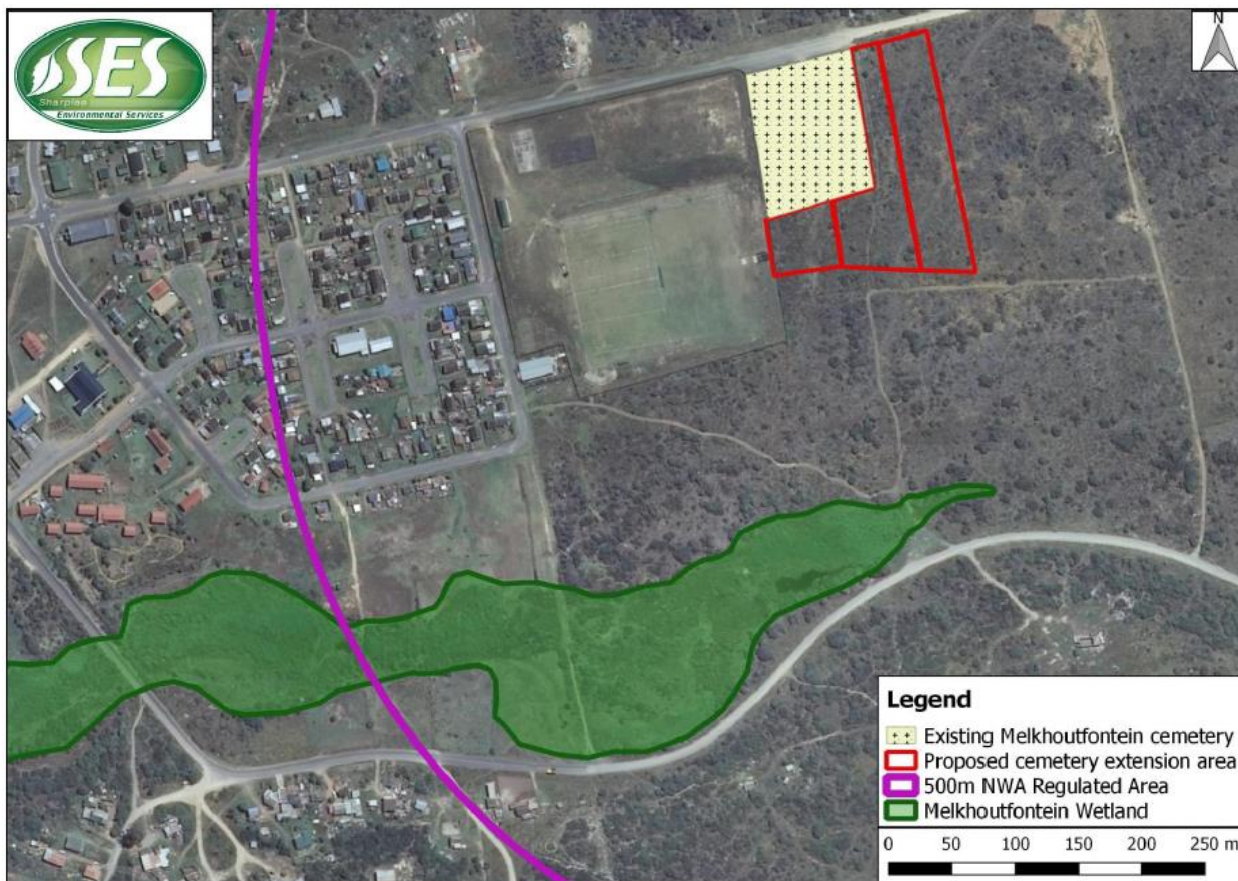


Figure 9: The proposed site of the cemetery expansion in relation to the nearest watercourse, the Melkhoutfontein Wetland.

5.2.2 Habitat Integrity, Ecological Importance & Sensitivity

The Freshwater Habitat Impact Assessment (2020) notes that the Melkhoutfontein Wetland has deviated from the estimated reference condition but maintains a fair level of natural ecological functioning and form. The Wet-Health2 assessment determined that the wetland falls within the 'C' ecological category for present condition. The Melkhoutfontein Wetland has an extremely high ecological importance and provides valuable services to society. The wetland feeds the dam which provides water supplies to the broader area. The habitat regulates stream flow into the dam and protects such infrastructure from flooding and erosion. The wetland provides water purification by cleaning pollutants that enter from the catchment prior to them entering the dam.

The recommended ecological category (REC) is used to inform future management objective for an aquatic ecosystem. The REC can be determined by using the PES (Present Ecological State) and EIS (Ecological Importance and Sensitivity) scores of the system (see table below; DWAF 2007). The wetland assessed has a Fair 'C' PES and a Very High 'A' EIS which places it in the REC 'B' category which advocates the improvement of the system.

5.2.3 Aquatic Critical Biodiversity Areas & the Western Cape Biodiversity Spatial Plan

According to CapeFarmMapper(Accessed October 2020) there are no areas mapped as Aquatic Critical Biodiversity Areas by the Western Cape Biodiversity Spatial Plan.

5.2.4 National Freshwater Ecosystem Priority Areas (NFEPA's)

The National Aquatic Ecosystem Priority Areas (NFEPA) map provides strategic spatial priorities for conserving South Africa's aquatic ecosystems and supporting sustainable use of water resources.

FEPAs were identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Driver et al. 2011). The NFEPA project identified the aforementioned Melkhoutfontein Wetland situated approximately 200 m south of the proposed expansion as a NFEPA Wetland.

5.3 Subsurface environment.

5.3.1 Hydrogeology

According to the Geohydrological and Geotechnical Assessment conducted by GEOSS South Africa (Pty) Ltd (2020), the underlying aquifer at the site is classified by the Department of Water Affairs and Forestry (DWAf, 2002) as an intergranular aquifer with an average yield potential of 5.0 L/s. An intergranular aquifer refers to groundwater that is stored and flows through pore spaces between grains of sediment or weathered material. Based on the DWAf (2002) mapping of the regional groundwater quality, as indicated by electrical conductivity (EC), is in the range of 70 – 300 mS/m for the area. This is considered to be “good to moderate” quality for water, with respect to drinking water standards. It is important to note that a small stream/drainage channel caused by the presence of a spring is located just south of the cemetery site. This flows towards the west into the Goukou River. Both the stream and river must be considered as a potential receptor for potential contamination.

The Geohydrological and Geotechnical Assessment (2020) notes that the national scale groundwater vulnerability map, which was developed according to the DRASTIC methodology (DWAf, 2005), indicates that the site has a “low to medium” vulnerability to surface-based contaminants. The number indicated in parenthesis at the end of each factor description is the weighting or relative importance of that factor. This “low-medium” rating is associated with the confined nature of the fractured aquifer. The site is underlain by mudstone that weathers to clay forming an impermeable layer above the fractured mudstone and sandstone that likely provide sufficient protection against point and non-point sources of contamination. The depth to groundwater provides further opportunity for natural attenuation in the vadose zone prior to reaching the groundwater.

The Geohydrological and Geotechnical Assessment (2020) notes that the national scale groundwater vulnerability map, which was developed according to the DRASTIC methodology (DWAf, 2005), indicates that the site has a “**high**” vulnerability to surface-based contaminants.

The DRASTIC method considers the following factors:

D = depth to groundwater (5); R = recharge (4); A = aquifer media (3); S = soil type (2); T = topography (1); I = impact of the vadose zone (5); C = conductivity (hydraulic) (3)

The number indicated in parenthesis at the end of each factor description is the weighting or relative importance of that factor. This “high” rating is associated with relatively shallow groundwater level (observed on and near the site, including the presence of a natural spring down-gradient of the site). The Wankoe Formation comprises largely unconsolidated sands and calcarenite (clastic or detrital sedimentary rock consisting largely of calcium carbonate grains). The aquifer is therefore classified as intergranular and therefore more susceptible to point and non-points sources of contamination.

5.3.2 Geologic and Hydrogeological Environment

The Geohydrological and Geotechnical Assessment (2020) explains that the site is underlain by the Wankoe Formation comprised of calcarenite (type of limestone) that show signs of aeolian type cross-bedding with the occasional presence of calcrete lenses. The Wankoe Formation is locally covered by light grey to pale-red sandy soil just south of the proposed cemetery site. The erosive action caused by the Goukou River and adjacent drainage channels towards the west and southwest of the site has exposed rocks of the De Hoopvlei Formation and Bokkeveld Group. The De Hoopvlei Formation is

comprised of calcarenite with shells and conglomerate lenses. The Bokkeveld Group is comprised of shale and siltstone with occasional thin sandstone beds.

The site visit involved the excavation of 12 trial pits coupled with DCP testing in an attempt to determine groundwater depth and quality, and soil properties respectively. The positions of the trial pits and DCP's were chosen to provide a good spatial coverage of the study area (vegetation permitting). The trial pits were excavated using a tractor loader backhoe (TLB) to a maximum depth of 3 m. Following the excavation, each trial pit was logged and photographed. A site walk-over sought to identify and confirm hydrological, hydrogeological and geotechnical features of interest. A total of 12 trial pits were excavated. Only TP09 intersected water during excavation.

Following the completion of trial pits, DCP testing and a site walkover, a typical soil profile was developed, and is summarised in Table 4 below.

Depth (mbgl)	Description
0.00 to ± 1.00	Dry, brown & orange brown, loose, intact, fine SAND. Transported sediment.
1.00 to ± 1.50	CALCRETE. Calcrete lens ranging in thickness from 0.20 to > 1.00 metres thick and present as soft to medium hard rock.
1.50 to ± 3.00	Dry, brown & white, medium dense, intact, silty fine SAND. Transported sediment.
> 3.00	Slightly moist, dark brown, medium dense, intact, clayey silty fine SAND. Transported sediment.

Table 2: Generalised soil profile (note these are disturbed samples).

6. Legal Framework

6.1 The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) as per EIA Regulations, 2014 (as amended 2017), gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of an activity listed in the Environmental Impact Assessment Regulations, 2014 (as amended 2017), in terms of the Listing Notices G.N. 324, 325, 326 & 327 published on the 7th April 2017.

Due to the fact that this development proposal consists of activities listed in the EIA Regulations, Listing Notice 1 and 3, a Basic Assessment Process was required and the respective reports (Basic Assessment Report and Appendices) were submitted to the Department of Environmental Affairs and Development Planning (DEA&DP), for assessment, before the environmental authorization was issued to the applicant, Hessequa Local Municipality.

Figure 10: Listed Activities in terms of the NEMA Environmental Impact Assessment Regulations (2014), as amended, that are to be triggered and therefore required an application for Environmental Authorisation to be submitted to the DEA & DP

Activity #	Listing notice 1. Description of Activity as per GN No. R 327
44	The expansion of cemeteries by 2 500 square metres or more.
Activity #	Listing notice 3. Description of Activity as per GN No. R 324

4	<p>The development of a road wider than 4 metres with a reserve less than 13.5 metres.</p> <p>Western Cape</p> <p>i. Areas zoned for use as public open space or equivalent zoning;</p> <p>ii. Areas outside urban areas;</p> <p>(aa) Areas containing indigenous vegetation;</p> <p>(bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or</p> <p>iii. Inside urban areas:</p> <p>(aa) Areas zoned for conservation use; or</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.</p>
12	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>i. Western Cape</p> <p>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>ii. Within critical biodiversity areas identified in bioregional plans;</p> <p>iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</p> <p>iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or</p> <p>v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.</p>
Activity #	Listing notice 2. (GN No. R325): Scoping & Environmental Impact Reporting
N/A	N/A

Therefore, in summary, the following activities will be applied for:

- Listing Notice 1: Activity No: 44;
- Listing Notice 3: Activity No: 4 & 12.

6.2 Other applicable legislation

The *Hessequa Local Municipality* is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on the their behalf, remain compliant with the conditions of the received authorisations, as well as the provisions of all other applicable legislation, including *inter alia*:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Water Act (Act 36 of 1998);
- National Forest Act (Act No 84 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);

- Civil Aviation Act, 2009 (Act No 13 of 2009), Civil Aviation Regulations, 2011 (Extract) Obstacle limitations and markings outside aerodrome or heliport. 139.01.30.
- National Health Act, 2003 (Act no.61 of 2003), Regulations Relating to Management of Human Remains (GN. R363 of 22 May 2013).

The National Water Act (Act 36 of 1998) provides the framework for the sustainable management of South Africa's water resources. It aims to protect, use, develop, conserve, manage and control water resources as a whole, promoting integrated water resource management that involves participation of all stakeholders. The Act declares the national government to be the public trustee of the nation's water. The Act is administered by the national Department of Water Affairs (DWA) via regional offices.

This development proposal is within 500m of a watercourse (Melkhoutfontein wetland). A General Authorisation in terms of section 21 (c) and (i) of the National Water Act (Act 36 of 1998) was obtained on the 1st of September 2020.

In terms of Section 15(2) of the Regulations relating to the Management of Human Remains, R363 of May 2013, an application for an exemption to this regulation is required. It is Hessequa Local Municipality's responsibility to ensure that an exemption is acquired prior to the commencement of construction. Moreover, the applicant, contractor and all construction personnel are to be aware of, and implement the current (as of commencement of activities) Covid-19 regulations and protocols (Government Notice No. 650 of 5 June 2020) during all phases of the proposed expansion, and should these regulations and restrictions be updated or changed, the project team should act accordingly and ensure compliance.

Furthermore, it is the Hessequa Local Municipality's responsibility to ensure that all other applicable permits, licences or approvals, not identified by the Environmental Impact Assessment process, are identified and obtained prior to the commencement of construction activities.

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

The proposed development activity will take place through various phases, namely: Planning and Design Phase; Pre-construction Phase; Construction Phase; Post-Construction Rehabilitation and Operational Phase, however it is not a phased project. Each phase has specific impacts or issues unique to that phase of the development activity. These phases of the development are listed below, and the impacts associated with each phase as identified through the environmental impact assessment process are identified and given a brief description. Brief management statements are provided, as well as a description of the desirable impact management outcomes.

7. Scope of this EMPr

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

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

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

8. General Environmental Management

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

Code of Conduct

The purpose of the Code of Conduct (CoC) is to minimise the impact of the activities associated with the construction phase on the environment. The rules and regulations prescribed in this CoC are intended to ensure that the impacts on the environment are not prejudiced by the construction activities. Failure to adhere to or any breach of this CoC will result in a fine being levied against the offending or defaulting party / individual.

Labourers during the construction phase must conserve the natural environment, endorsing the principles of sustainable use and minimum impact. They must also be sensitive to the impact of their operation on the environment within which they work and minimise any adverse impacts.

This EMPr forms an integral part of the activities during the construction phase and as such, is legally enforceable. In addition to the restrictions and controls provided for in this EMPr, the environmental controls comprise the following:

Engineers

- Unless otherwise stated by the Holder, only a registered engineer must be appointed for the construction phase of the development.
- The engineer shall provide work or services of a quality and scope, and to a level, which are commensurate with accepted standards and practices.
- The engineer shall be impartial in decision-making, provision of advice and judgement.

Contractors and sub-contractors

- Unless otherwise determined, only appropriately registered contractors shall be appointed.
- It shall be the responsibility of the Holder / engineer to ensure that the contractors abide by and comply with the rules and regulations of the Code of Conduct.
- Contractors shall at all times be responsible for their sub-contractors and employees whilst they are on the development property.

Rules and Regulations

It is of vital importance that engineers and contractors understand and acknowledge that they are working on an environmentally sensitive development and agree to conform to all environmental controls specified in this EMPr and any additional input by the ECO. In addition to the EMPr, the environmental controls comprise the following:

- **Building Plan Controls**

- A copy of the approved and signed building plans must be available on site during the construction phase of the development.
- Variations of the building plans must be approved by the Engineer / Holder prior to being implemented.
- Prior to commencing construction of any infrastructure, the contractor must remove all topsoil and store it in a berm of not more than 2m high, away from construction activities and sensitive environmental features, within the designated footprint of the site.

- **Site tidiness**

- The contractor must keep the appearance of his building site neat and tidy at all times. Building rubble must be removed from site at regular intervals, and litter must be removed from the site on a daily basis. Refuse drums must be available on site which waste can be placed in. The drums must be emptied on a regular basis and the waste taken to a licenced local waste disposal facility.

- **Safety**

- The contractor must comply with the Health and Safety Act (Act No. 85 of 1993), as amended, together with such regulations promulgated thereunder.

8.1 Site access and traffic management

Access to the development is proposed via Rooipitijie Road, located to the North of the proposed site. This road also acts as the current access for the existing cemetery site.

All construction vehicles need to adhere to traffic laws and regulations, drivers must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far as possible, care must be taken to ensure that the local traffic flow pattern is not significantly disrupted, therefore vehicle operators need to be educated in terms of "best-practice" operation in order to minimise unnecessary traffic congestion or dangers. These practices include, but are not limited to:

- not unnecessarily obstructing the access point or traffic lanes used to access the site;
- considering the load carrying capacity of road surfaces and;
- adhering to all other prescriptive regulations regarding the use of public roads by construction vehicles.

Adequate signage that is both informative and cautionary to passing traffic must be erected to warn other road users (motorists and pedestrians) about the presence of construction vehicles, particularly at the point where construction vehicles enter/ exit the site from the N2 warning them of the construction.

Signage would need to be clearly visible and include, amongst others, the following:

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

Other mitigation measures include:

- No construction to take place over or during the construction closure period in December – January without prior permission from the relevant authorities.

- Construction vehicles must adhere to the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles.
- ECO to do awareness training with the contractor and labourers and to highlight the traffic related risks before construction commences.
- Where possible, construction traffic that may obstruct traffic flow on the surrounding roads must be scheduled for outside of peak traffic times.
- Ensure appropriate behaviour of operators of construction vehicles.

8.2 Site demarcation

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

8.2.1 Construction working area

Prior to the commencement of any land-clearing or construction activities, the outer boundary of the development area must be surveyed and pegged. This demarcation boundary is to ensure that land clearing and construction activities are restricted to only that area strictly required for the proposed development, and to prevent unnecessary disturbance of soil surfaces and vegetation outside of the development footprint. Signage is to be erected informing the public of a construction site a prohibiting access beyond the fence line.

The outer boundary of the working area must be enclosed with orange barrier netting fencing, shade netting, droppers & wire/ danger tape, or similar – as feasible and practical. The fencing must be retained and maintained for the duration of the construction period and must not be moved during construction unless agreed otherwise with the ECO. Areas to be cleared must be demarcated before any clearing and grubbing commences.

8.2.2 No-go areas

Prior to the commencement of any land-clearing or construction activities, all sensitive areas (as identified by the ECO), must be demarcated and must not be disturbed during the construction phase. It is recommended that the No-Go areas be demarcated with a suitable material of natural colours, i.e. green or brown biddum, to ensure less visual impact during construction. Danger tape flagging (pieces of danger tape tied to twine or rope) may be utilised, however the use of only danger tape is not recommended for long-term demarcation as this will easily become untidy and blown away by the wind resulting in pollution.

No-go areas could include areas with steep slopes, greenbelt / corridor areas, public open spaces, drainage lines, streams and/or other wetlands outside of the approved development area. No-go areas outside the approved development area must be off-limits to all construction workers, vehicles and machinery during all phases of the development. No vegetation may be cleared from within the no-go areas, and no dumping of any material (waste, topsoil, subsoil etc.) may occur in these areas. Construction workers must be informed of the no-go areas, and if necessary appropriate signage can be used to enforce the demarcation. Any potential interaction with no-go areas must be consulted between the contractor and ECO prior to any actions.

As described in the Freshwater Habitat Impact Assessment (2020), a 32m buffer area has been recommended by the Freshwater Specialist, it will extend from the boundary of the riparian habitat, and must be adopted, no demarcation is necessary, as the development resides approximately 200m's north fo the watercourse, and the demarcation of the development footprint is essential, therefore no activities or personnel should encroach beyond this footprint. This buffer area is to be regarded as a no-go area during construction and operation, encompassing the wetland and watercourse area. Vehicles must not

be driven along the eastern boundary of the site, outside of the demarcated working area. There should be no need for vehicle or labour to encroach further south of the proposed boundary, therefore no personnel or vehicles must be located outside of the recommended demarcated area, and interaction with the wetland/watercourse area to the south must be strictly prohibited.

8.2.3 Demarcation of the site camp

The area chosen for the site camp and associated facilities must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. It is recommended that easily accessible, transformed areas must be used for the site camp, at least 100m away from any no-go areas. Site selection must be done in consultation with the ECO.

8.3 Site camp and associated facilities

The set up and organisation of the site camp is paramount to ensuring compliance. An environmental file is to be created by the contractor and be situated within the site camp throughout the construction phase and with the applicant thereafter. The environmental file is to include the following;

- A copy of the Environmental Authorisation
- A copy of General Authorisation or any other relative permits
- A copy of the approved EMPr
- Updated Waste slips
- Disposal slips or cleaning slips (ablution cleaning)
- All EMR's (Environmental Monitoring Reports) and ECO instructions
- Copies of Environmental induction register/s
- The Protocol for chance Palaeontological Findings
- A complaints register
- Updated method statements
- Any and all emergency procedure/s applicable to site activities
- An Incident Register

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

8.3.1 Fencing & Security

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

8.3.2 Fire Fighting Equipment

No less than 2 fire extinguishers must be present in the site camp. The extinguishers must be in a working condition and within their service period. A fire extinguisher must always be present wherever any "hot works" (e.g. welding, grinding etc.) are taking place. It is recommended that all construction workers receive basic training in fire prevention and basic fire-fighting techniques and are informed of the emergency procedure to follow in the event of accidental fires. Open fires and smoking must be prohibited on site. However, it is noted that despite this, incidents may arise where fires are created after hours by security, and labour may attempt to smoke on site. In these cases, measures must be taken to ensure that activities are managed appropriately. Therefore, should a fire be created on site after hours, the following procedure must be followed:

- Ensure that the security is aware that creating fires within the site is prohibited.

- Should he choose to create one beyond the demarcated area, he is solely responsible for the management.
- He/she must ensure that:
 - They utilize a metal barrel and contain the fire within, outside of the proposed site.
 - It may not be positioned close to any vegetation, no-go area, natural areas or flammable material.
 - Do not leave fire unattended.
 - Monitor and extinguish any embers that may escape.

Should the contractor choose to, he/she must designate a smoking area within the site camp, of which the contractor is solely responsible for the management of this activity on site, and any incidents that may occur. It must contain the following features:

- Appropriate signage.
- A barrel/bucket filled to 50% capacity with sand, for disposal of used cigarettes.
- An appropriately weighted lid, that cannot be easily displaced by volatile weather conditions
- The bin and designated area must be positioned in such a manner that it is not directly affected by heavy winds.
- This bin must be emptied as is necessary and must not be allowed to reach 75% capacity.

In the case of accidental fires, the contractor must (if required/significant) alert the Local Authority's Fire Department as soon as a fire starts prior to the fire becoming uncontrollable.

8.3.3 Waste Storage Area

Sufficient bins for the temporary storage of construction related waste must be provided inside the site camp and/or at the working area and must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. Sufficient signage and awareness must be created to ensure that these bins are properly used.

8.3.4 Hazardous Substances Storage Area

Fuels, chemicals, lubricants and other hazardous substances must be stored in a demarcated, secured, bunded and clearly sign-posted area within the site camp away from the watercourses on site. Sufficient signage and awareness must be created to ensure that these bins are properly used.

8.3.5 Potable Water

An adequate supply of potable water must be provided to construction workers at the site camp.

8.3.6 Ablution Facilities

Chemical toilets must be kept at the site camp, preferably north of the site, on a level surface and secured from blowing over and located in such a way that the toilets will not cause any form of pollution. As per the SANS10400 requirement, one ablution facility for every 8 male workers and 2 ablution facilities for every 8 female workers will be provided. The ratio of 15 people per ablution facility must not be exceeded.

Toilets must be placed at least 100m from any watercourse. The ablution facilities must not be linked to the river system in any way. Toilets must be serviced regularly and kept in an orderly state, by a registered company. Disposal slips of proof of (at least) weekly cleaning, must be filed in the Environmental File for record keeping purposes. The contractor must ensure that no spillage occurs when the toilets are cleaned, serviced or moved. Performing ablutions outside of the provided toilet facilities is strictly prohibited and the ECO would need to regularly inspect the state of the chemical toilets to ensure compliance. The Contractor must educate himself, and his staff, on the closest, registered waste disposal facility, that would accept contaminated soil, or other waste of this manner, etc, should it occur, so as to dispose of contaminated material properly. Proof of these disposals must be obtained from the registered facility, to be included in the Environmental File, should they occur.

8.3.7 Eating Area & Rest Area

A dedicated area within which construction workers can rest and eat during breaks must be provided within the site camp. Seating and shade must be provided, along with appropriate waste receptacles.

8.3.8 Vehicle & Equipment Maintenance Yard

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

8.3.9 House-keeping

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

8.4 Search and Rescue

The search and rescue of bulbs and cuttings of succulents for use in the rehabilitation of disturbed areas within the cemetery footprint (roadside / entrance landscaping) must be considered before clearing, in line with the Rehabilitation plan in Appendix C. It must be noted that a Permit is required for the removal of SCC. However, the Biodiversity Survey (2020) has confirmed that the identified SCC (Species of Concern) are located outside of the proposed footprint, however in close proximity to the site, therefore the demarcation of the footprint is essential. Prior to clearing, the ECO is to ensure that no SCC have established over time.

Rescued plants should be replanted into a nearby disturbed area of similar habitat or for open space rehabilitation (roadside / entrance landscaping) on site in accordance with the ECO recommendations. Rescued plants must be provided with sufficient water and handled in accordance with the botanist and ECO recommendations.

Once site boundaries are demarcated, the area to be cleared of vegetation will be surveyed under the supervision of the ECO in order to identify and remove faunal species suitable for rescue and relocation. Rescued fauna must be released into a nearby area of similar habitat away from any construction.

8.4.1 Protection of fauna

Construction workers are to be sensitised to the fact that they may encounter fauna during the construction period. This must be included in the environmental awareness training completed with all site personal before any construction. No faunal species are to be trapped, kept or killed, and if any fauna is encountered by construction workers, the ECO is to be notified. If the ECO is not on site, the site manager is to be informed. It is encouraged that daily search and rescue of fauna be undertaken, throughout construction phase. The occurrence of Crepuscular or Nocturnal mammals is to be considered when conducting search and rescue. It must be noted that a Permit is required for SCC removal and rescue.

8.5 Indigenous vegetation clearing and protection.

Where indigenous vegetation must be cleared for the development the following measures must be implemented:

- Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing commences.

- Where feasible vegetation must simply be trimmed to facilitate access/ construction, rather than being completely cleared or removed.
- A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration.
- Vegetation clearing/trimming must be cleared by hand (i.e. brush cut) and stockpiled for use as mulch/ brush-packing during rehabilitation of the site. Any alien vegetation that is cleared must be disposed of in consultation with the ECO, unless the cleared alien vegetation does not contain seeds in which case it may be retained for use in site rehabilitation.
- Only the areas required to accommodate the construction and access to the construction site must be cleared/trimmed of vegetation.
- After any clearing is completed, an appropriate cover crop must be planted where any weeds or exotic species are removed from disturbed areas timeously.
- Vegetation outside of the construction footprint and within any no-go areas must not be cleared.
- Land clearing and earthmoving activities must not be undertaken during strong winds, where possible.

The proposed development requires the clearance of vegetation, however the following measures must be implemented to protect the indigenous vegetation where possible.

- Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences.
- No clearing outside of development and infrastructure footprint area to take place.
- Rescued plants should be replanted into a nearby disturbed area of similar habitat or for open space rehabilitation.
- An Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here.

8.6 Topsoil and subsoil management

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

- If the topsoil and subsoils are found to be of acceptable quality, the topsoil and subsoil must be stockpiled for the duration of the active construction period and utilised for the final landscaping and rehabilitation of disturbed areas on site. Should the topsoil be found to be of poor quality, new topsoil may be purchased from a registered company.
- Stockpiles must not be placed in vegetated areas that will not be cleared.
- Stockpiles must not be positioned outside of the demarcated area utilized for construction activity.
- Stockpiles must not be located within 100 metres of watercourses.
- The topsoil berm may be a few meters wide but must ideally not be more than 2m high to allow light and air penetration.
- Removed subsoil must be stockpiled separately from topsoil.
- The topsoil & subsoil storage area must be located on a level bunded area outside of any surface drainage channels outside the riparian zone, and at a location where it can be protected from disturbance and river flow/floods during construction and where it will not interfere with construction activities.
- Topsoil and subsoil stockpiles must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth or other suitable measures must be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles must not be covered with tarpaulin, as this may smother and decrease the virility of topsoil.

- Handling of topsoil must be minimised as much as possible, and the location of the topsoil berm must be chosen carefully to avoid needing to relocate the topsoil berm at a later date.
- Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.
- If soil stockpiles will be stored for an extended period of time, the stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
- Soil material that will not be re-utilised on site may be removed from site and taken to an appropriate site for re-use or disposal.
- Topsoil removed from fynbos areas to be reused in rehabilitation areas, e.g. open space areas. Where possible, topsoil from fynbos areas, containing indigenous plant seeds, should be transferred immediately to rehabilitation areas rather than being stockpiled, as stockpiling kills important fungi, microbes, seeds and soil fauna. Topsoil stockpiles of this kind must not exceed 0.5 m in height and must not be compacted.
- Topsoil and subsoil utilised for rehabilitation must not contain litter, or any other waste material.
- Note that the topsoil must be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.

8.7 Integrated waste management approach

It is recommended that an integrated waste management system is adopted on site. The system must be based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Separate waste bins/skips that are weather and animal proof must be provided for recyclable waste, general waste and hazardous waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site camp, or in separate skips until removal. These bins/skips must be emptied, and the waste taken to a registered recycling facility. The receipts from the facility must be kept on file and must be available on request.

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

Chemical toilets present a risk to the surrounding environment and must be managed accordingly. Chemical toilets must be kept within the site camp (not be linked to the storm water drainage system), on a level surface and secured from blowing over. Chemical toilets must be regularly emptied, by a registered cleaning company and the waste disposed of at an appropriate wastewater disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets. Ablutions must be further than 50m from the watercourses.

Hazardous substances such as diesel, oil and detergents will be present on site throughout the construction phase of the proposed development. Hazardous substances pose a greater risk to the surrounding environment than general substances and therefore need to be managed accordingly. A designated storage area within the site camp that is clearly demarcated must be set aside for the storage of hazardous substances and is to be treated as a no-go zone to unauthorised personnel. Appropriate signage, Material Safety Data Sheets (MSDSs), recently serviced fire extinguishers and spill kits must accompany the hazardous substances. Appropriate storage of hazardous substances is important while drip trays must always be utilised when decanting of hazardous substances and when refilling chemical/ fuel storage tanks. If any spills do occur, the soil must be excavated and disposed of as hazardous waste.

8.8 Erosion control and stormwater management

Appropriate measures must be implemented to control the flow of stormwater across the construction site, in order to prevent possible flooding, soil loss and dispersion of pollutants. To prevent excessive erosion activities, exposed earth surfaces must be protected from wind and water erosion.

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

The prevention of soil erosion can be initiated by designating specific areas for stockpiling of raw materials with consultation of the ECO. No stockpiling is to occur on or near slopes or water resources (must not be located within 50 metres of the watercourse) and all stockpiling areas must be approved by the ECO before stockpiling occurs.

Stockpiles need to be effectively managed and maintained as they have the potential to contribute to runoff and erosion. To prevent this, the following management measures must be implemented.

- Stockpiles of topsoil & spoil material must be protected from wind & water erosion.
- Stockpiles of earth material must not be located within any storm-water drainage pathways and must be outside of the reach of potential flood waters.
- Any erosion runnels/ gulleys/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. Rehabilitation of erosion channels must be ongoing during the construction phase and not left until the end of the construction period.

It may be necessary to implement small-scale erosion protection measures at the construction site, to prevent soil erosion. Such measures may include the use of shade netting, geo-fabric, brush-packing or similar barriers in areas susceptible to erosion and along exposed slopes. The storm water management plan must adhere to the principles of sound storm water management. The storm water management system must be implemented on site and must be properly maintained in order to ensure that contaminated run-off from the construction site is prevented from flowing into the watercourse.

Cleared areas and any other area susceptible to erosion must be provided with a suitable cover and stabilised as soon as possible via the implementation of appropriate erosion control measures. This may include use of cut-off drains, temporary/permanent drainage channels, brush-packing, mulching, planting or sodding, use of environmentally benign soil binders, use of geo-textile or other coverings. The appropriate measures must be selected by the contractor in consultation with the Engineer & ECO.

Areas must be rehabilitated, and a suitable cover crop planted once specific phases of construction is completed.

8.9 Construction near a watercourse

The contractor needs to be mindful of the nearby watercourse. A minimum buffer of 32m must be implemented to protect the aquatic system and maintain the present ecological processes. This buffer area must be regarded as a no-go area. No stockpiles are to be located outside of the development footprint and erosion control measures may be required around stockpiles, while the use of grease traps/oil separators may be used to prevent pollutants from entering the environment are recommended as no pollution of surface water or ground water resources may occur due to any activity on the site. A monitoring programme shall be in place to ensure compliance with this EMPr throughout the construction phase.

Once construction has been completed, the objective would be to promote the re-establishment of the ecological functioning of any area disturbed by construction activities and maintain a healthy system throughout operation. The buffer area regarded as a no-go area during construction will be zoned as public open space during the operational phase of the development. During the post-construction and operational phase of the development, erosion features that have developed are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed.

The area must be maintained through alien invasive plant species removal and the establishment of indigenous vegetation cover to filter run-off before it enters the freshwater habitat. Placement of signage near the boundary of the buffer zone must also be considered to help mark the boundary and educate the community about the purpose and value of protecting buffer zones. Information can include a description and visual of alien invasive plant species.

8.10 Excavations and Earthworks

Any major earthworks with bulldozers and heavy machinery must be under constant supervision and operators are to be aware of all the environmental obligations, as there is always the potential to inflict damage to the sensitive areas. Any unnecessary or excessive heavy machinery movement must be kept to a minimum i.e. only what is absolutely necessary. Areas to be excavated must be clearly demarcated. Areas, which have already been excavated and entail fairly significant earthworks, must be similarly demarcated to avoid the spreading of construction activities into more sensitive areas.

All excavated material must be stored on a flat surface away from any drainage line or area susceptible to erosion. The location must be decided upon in consultation with the ECO. Stored material must be protected from wind and water erosion and this may entail covering the material with suitable shade cloth material or similar (if and when necessary). The shade cloth may need to be weighed down in such a manner that any stream flow is directed away from the stockpile, reducing the risk of erosion.

In the event that any heritage resources (human remains, grave stones, stone tools, artefacts, old coins and pottery, fossil shell middens, rock art and engravings, remains of old built structures etc.) are encountered during construction, the finding must be protected from further disturbance (ideally left in situ) and the ECO and relevant Heritage Authority (heritage Western Cape) must be notified. The finding must be handled and/or removed from site as per instructions issued by the Heritage Authority or delegated heritage specialist.

8.11 Visual Impact.

There will be a change from an undeveloped, to a developed site. Alteration of the site will support a positive visual impact, as the site will be cleared of alien invasive species, will boast a new ablution facility, an extended access road, a new fence, and will be maintained, in addition dumping located at various positions on site, will be removed.

In order to minimise the potential visual impact during the construction phase, all working areas, storage facilities, stockpiles, waste bins, elevated tanks and the site camp must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible.

Waste must be managed according to this EMPr. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy. The site camp may require visual screening via shade cloth or other suitable material. The use of reflective materials and excessive lighting should be avoided, and construction vehicles must enter and leave the site during working hours.

8.12 Noise management.

Additional noise is expected during the construction period due to construction activities. It is important that a noise complaints register must be opened and that all excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible. Work on site must be well-planned and must proceed efficiently so as to limit the duration of the disturbance. This is to be done by ensuring that all equipment is in good working condition and fitted with mufflers/exhaust silencers if necessary.

Noise levels must comply with the relevant health & safety regulations and SANS codes and must be monitored by the Health & Safety Officer as necessary and appropriate and all affected parties must be informed of the excessive noise factors.

8.13 Dust management.

Although the generation of dust is synonymous with construction sites, care needs to be taken to prevent excessive dust from impacting the surrounding environment and community. Majority of the dust causing activities will take place during the construction period. Exposed surfaces, such as stockpiles and cleared areas must be provided with a suitable cover as soon as possible or wetted down. Construction vehicles must maintain low speeds of 20-40km/h on site and must ensure that tarpaulins are used to cover any loads transported. Dust levels specified in the National Dust Control Regulations (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m²/day, measured using reference method ASTM D1739.

A Complaints Register must be available at the site office for inspection by the ECO of dust complaints that may have been received.

8.14 Heritage Resources

Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities, all works must be stopped immediately, and Heritage Western Cape must be notified without delay. No activity may continue without permission from the ECO or Heritage Western Cape.

Heritage Western Cape:

T: 021 483 5059

E: hwc.hwc@westerncape.gov.za

8.15 Site closure and rehabilitation

Upon completion of the construction phase, and after each maintenance event, all disturbed areas, including the working area (disturbance corridor), temporary access road, and all areas utilised for the site camp and associated site camp facilities will require rehabilitation as per the Rehabilitation plan in Appendix C and as follows:

- On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.
- All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped to improve filtration and reduce run-off.
- All demarcation fencing, including all droppers, wires, netting and barrier tape must be removed from site and taken to an appropriate site for re-use or disposal.
- Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the ECO. Any soil contaminated with hydrocarbons (oil,

fuel, etc) or other hazardous substance must be collected and disposed of as hazardous waste to a licenced disposal facility.

- All construction waste is to be removed from the site and disposed of at an appropriate facility. Burying or burning of waste or rubble on site is strictly prohibited.
- Topsoil that was removed and stockpiled before construction, must be replaced by spreading it evenly over the areas from which it was removed. This topsoil (and the seedbank it contains) will facilitate the re-vegetation of the site.
- Disturbed areas, especially areas where excavations have taken place, must be shaped as appropriate (original topography must be restored where possible), and covered with a layer of stockpiled topsoil as soon as possible.
- Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and disposed of at an appropriate disposal site.
- The disturbed, newly rehabilitated surfaces (particularly steeper slopes and areas recently covered with topsoil) must be protected from wind & water erosion using mulch, brush packing or other appropriate erosion protection measures. Brush-packing/ mulching is done by covering the exposed surface with organic plant material such as branches, plant cuttings and leafy material. Ideally the vegetation removed from site at the start of the construction must be utilised. Brush-packing/ mulching plays a valuable role in erosion control, while also promoting re-vegetation of the site by retaining moisture in the soil, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) to promote new plant growth.
- Final landscaping and rehabilitation of the site must be done to the satisfaction of the ECO and must adhere to all conditions/ requirements of the Environmental Authorisation.

9. Environmental Impact Management: Planning and Design Phase

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

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

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

- Appoint an Environmental Control Officer.
- Complete the detailed design of the structures and detailed site layout plan.
- Update the EMPr (if necessary).

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

9.1 OBJECTIVE 1: APPOINTMENT OF AN ENVIRONMENTAL CONTROL OFFICER

Impact Management Objective: To appoint a suitably qualified and experienced ECO and Environmental Auditor.		
Potential impact to avoid	Failure to appoint an ECO and an Environmental Auditor will result in non-compliance with the requirements of the EMPr.	
Impact Management Outcome	The requirements of the EMPr are implemented and monitored during all phases of the development, which will promote sound environmental management on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • A suitably qualified and experienced Environmental Auditor must be appointed before any activities commence on site. • A suitably qualified and experienced ECO must be appointed before any activities commence on site. • The appointed ECO must adhere to the requirements stated in Chapter 15 and any other requirements specified in the Environmental Authorisation. 	Hessequa Municipality / Engineers	During design phase

<ul style="list-style-type: none"> The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training of construction workers. 		
Performance Indicator	A qualified ECO is appointed prior to the commencement of any construction activities (including pre-construction set-up activities) on site.	

9.2 OBJECTIVE 2: DETAILED DESIGN AND SITE LAYOUT PLAN

Impact Management Objective: To compile a detailed design and site layout plan that adheres to the recommendations of the BAR and any additional conditions which may be included in the Environmental Authorisation.

Potential impact to avoid	Substantial deviation from the conceptual layout plan may result in: <ul style="list-style-type: none"> Non-compliance with the Environmental Authorisation during construction. Triggering of additional listed activities not authorised in the Environmental Authorisation. An increase in the severity of the impacts identified and assessed in the environmental impact assessment process or may result in new impacts not previously assessed and not provided for in the EMPr, resulting in environmental degradation.
Impact Management Outcome	Development is compliant with recommendations of the EIA and the EMPr.

IMPACT MANAGEMENT ACTIONS

Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> The final detailed design & layout must adhere to the conceptual layout assessed in the Environmental Impact Assessment process. The final detailed design & layout must adhere to any conditions of the Environmental Authorisation (EA). If the final detailed design differs significantly from that assessed during the Environmental Impact Assessment, the revised layout must be assessed by an Environmental Consultant and the received EA must be amended by the Competent Authority before proceeding. Interested & Affected Parties may need to be provided with an opportunity to comment on any proposed amendment to the EA depending on the significance of the changes. Construction activities must be planned to conclude before the next potential butterfly flight period in early November. 	Consulting Engineer	During design phase
Performance Indicator	Detailed designs and site layout plans that adhere to the conditions of the EA and EMPr are finalised prior to the commencement of construction.	



10. Environmental Impact Management: Pre-construction Phase

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

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

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

10.1 OBJECTIVE 1: IDENTIFY & DEMARCATÉ NO-GO AND WORKING AREAS

Impact Management Objective: Identify and demarcate no-go areas, working areas and site facilities.		
Potential impact to avoid	<ul style="list-style-type: none"> • Degradation of the no-go areas during construction and operation, which include the aquatic buffer and remainder of the public open space. • An unnecessary increase in disturbance footprint. 	
Impact Management Outcome	Future construction activities will be restricted to within the designated areas & environmentally sensitive areas (no-go areas) will be protected from disturbance.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • The environmentally sensitive areas must be identified and be designated as no-go areas. • Demarcation of working area and no-go areas must be done in accordance with Section 8.2 of this EMPr. No demarcation of the watercourse is necessary as the development resides approximately 200m's north fo the watercourse. • Site camp facilities must be situated as far away from the No-Go areas as possible. • Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences. • Site boundary to be demarcated. 	Contractor	Pre-construction phase (prior to arrival of construction equipment, machinery, or workers on site)



<ul style="list-style-type: none"> ECO to identify any SCC that have been established. If any SCC are identified, the Rehabilitation plan in Appendix C is to be followed. 		
Performance Indicator	No-go areas, working areas and areas for site camp facilities have been identified and appropriately demarcated to the satisfaction of the ECO, before construction activities commences on site.	

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

Impact Management Objective: To set up and equip the site camp and associated site facilities in a manner that will promote good environmental management.

Potential impact to avoid	<ul style="list-style-type: none"> An inadequate location for the site camp facilities may result in impacts to sensitive resources (e.g. contaminated run-off from refuelling area may flow into watercourse). Failure to properly demarcate and set up site facilities may result in disorganised construction activities and unnecessary disturbance to the site. Failure to provide the necessary site facilities and/or failure to equip these facilities with the necessary equipment/materials may impede good environmental management & compromise ability to respond to emergencies.
Impact Management Outcome	Site camp facilities do not impact significantly on environment. The equipment required to implement the provisions of the EMPr are provided on site.

IMPACT MANAGEMENT ACTIONS

Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> The site camp and site facilities described in Section 8.3 of this EMPr must be provided on site. The site camp and associated site facilities must be set-up and managed in accordance with the general environmental management measures specified in Chapter 8 of this EMPr. The site camp must be strategically set up, away from freshwater resources, in a manner that will promote good environmental management during construction/ demolition, and to respond to potential emergencies (including fires, spillage of hazardous substances etc.) that may arise. The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. An environmental awareness programme is to be held with construction personal prior to construction. Inform the labour of the possibility of heritage resources being present. 	Contractor / Developer	Pre-construction phase (prior to start of construction activities)



<ul style="list-style-type: none"> Utilize only already disturbed/transformed areas must be used for the accommodation of construction plant, construction material, offices, etc. during the construction phase. Lepidopterist to recommend a buffer zone. Stockpiles must not be placed in vegetated areas that will not be cleared. No stockpiling is to occur within any 100m of water resources. Stormwater outlet must be designed to prevent erosion at discharge points. It is recommended that consideration be given to the stormwater management plan when establishing site camps and associated facilities. 		
Performance Indicator	Appropriate, well organised and properly equipped site facilities are available on site prior to commencement of construction activities. The location and set up of the facilities do not impact on the natural resources.	

10.3 OBJECTIVE 3: PRE-CONSTRUCTION ECO INSPECTION

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

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



<ul style="list-style-type: none"> • Consider search and rescue of bulbs and cuttings of succulents for use in the rehabilitation of disturbed areas. It must be noted that a Permit is required for the removal and rescue of SCC. • Appoint a suitably qualified Lepidopterist to undertake a site visit as per the specified period, to establish the presence of the remaining butterfly species of concern. • Lepidopterist to recommend a buffer zone prior to the commencement of activities. 		
Performance Indicator	A pre-commencement site inspection is conducted by the appointed ECO before construction activities commence on site.	

11. Environmental Impact Management: Construction Phase

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

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

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

- Prevent soil erosion & sedimentation.
- Protection of Riparian vegetation.
- Protection of indigenous vegetation.
- Prevent water pollution.
- Noise impact management.
- Visual impact management.
- Dust impact management.
- Creation of business & employment opportunities.
- Minimisation of the traffic.

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



11.1 OBJECTIVE 1: PREVENT SOIL EROSION AND SEDIMENTATION.

Impact Management Objective: To prevent soil loss on site and prevent increased turbidity / sediment load in watercourses.		
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Decrease in the soil binding capacity and cohesion of the soils. • Formation of rills and gullies. • Increased concentrated runoff. • Reduced infiltration and increased surface runoff. • Soil compaction. 	
Impact Management Outcome	Soil erosion at the water courses are kept to a minimum and the aquatic systems are not impacted significantly as a result of soil erosion.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • It is advised that an Environmental Control Officer visit the construction site before construction occurs within any of the watercourses and possibly during construction within the watercourses. • Ensure photos are taken of the aquatic zone, prior to commencement of activities, to ensure that should alterations occur during construction, the area can be rehabilitated, appropriately. • A 32 m aquatic buffer zone must be indicated between any proposed activities and the river edge. • No demarcation of the watercourse is necessary as the development resides approximately 200m's north fo the watercourse.If site development does not occur soon after preparation of the site, a suitable cover crop to be established as a temporary measure. • Only the area required to accommodate construction activities within the working area must be cleared of surface covering. Unnecessary clearing/ disturbance of land and exposure of soil must be avoided. • Soil surfaces must not be left open for lengthy periods to prevent erosion. • The SuDS Stormwater management and drainage system must inform the stormwater design of developed areas. • The storm water management plan must adhere to the principles of sound storm water management. The storm water management system must be implemented on site and must be properly maintained. • Clean and contaminated storm water must be kept separate. Contaminated run-off from the construction site must be prevented from flowing into the streams. • Land clearing, earth-moving and construction activities must not take place during heavy rains, or windy conditions. 	Contractor	Construction phase



<ul style="list-style-type: none"> • Designated areas for stockpiling of raw materials must be identified before material is brought onto site. No stockpiling is to occur on or near slopes or water resources (must not be located within 50 metres of the watercourse). All stockpiling areas must be approved by the ECO before stockpiling occurs. • Stockpiles of topsoil & spoil material must be protected from wind & water erosion. • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. Alternatively, the exposed slopes must drain into small temporary stormwater and silt traps/ponds. • Any erosion runnels/ gulleys/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. Rehabilitation of erosion channels must be ongoing during the construction phase and not left until the end of the construction period. • Should extensive damage occur to any aquatic system, where rehabilitation is required, a suitably qualified aquatic specialist must audit the site. 		
Performance Indicator	The water courses are not significantly impacted as a result of soil erosion.	

11.2 OBJECTIVE 2: PROTECTION OF RIPARIAN VEGETATION.

Impact Management Objective: To ensure that the riparian vegetation is not significantly impacted on.		
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Loss of viable vegetation, and fauna, allowing for the success of alien vegetation. • Reduction in riparian ecosystem function. • Erosion and sedimentation. • Possible burial of aquatic habitat, flora and fauna. • Alien vegetation encroachment. 	
Impact Management Outcome	Construction activities do not significantly impact on the riparian ecosystem.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • The Valley is to be regarded as a No-go area. • The furthest distance between activities and the wetland must be maintained (the proposed cemetery boundary is more than 200 m away from the wetland). A minimum buffer zone of 32m is to be applied. • Outside the working corridor, all watercourses are to be considered no go areas and a 32 m construction buffer must be adhered to. Any unnecessary intrusion into these areas is prohibited. 	Contractor	Construction phase



<ul style="list-style-type: none"> • Erect signage indicating the buffer zone, and restricting access to any unauthorized personnel. • A monitoring programme must be implemented to ensure maintenance of this buffer zone, and minimal disturbance from construction activities. • Removal of alien invasive species must be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. • Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota. • Alien/ invasive species shall not be stockpiled, they must be removed from site and dumped at an approved site. A disposal slip must be obtained for record keeping purposes. • Construction personnel, equipment and materials must be limited to the minimal practical working area. • Construction workers and vehicles must be prevented from entering the watercourse. • Bund stockpiles and ensure they do not exceed 2m's in height. • Stockpiles must not be located within 100 metres of the watercourse. • Soil contaminated by spilled oil/ fuel/ lubricant must be excavated and disposed of in the hazardous waste bin. • It is encouraged that daily search and rescue of fauna be undertaken, throughout construction phase. The occurrence of Crepuscular or Nocturnal mammals is to be considered when conducting search and rescue. 		
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Performance Indicator	Riparian habitat is free of alien invasive species and is in a healthy state.
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11.3 OBJECTIVE 3: PROTECTION OF INDIGINOUS VEGETATION.

Impact Management Objective: Protect and conserve the Indigenous Vegetation on site.

Potential impact(s) to avoid	<ul style="list-style-type: none"> • Disturbance or loss of intact vegetation. • Increased erosion. • Alien species infestation.
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Impact Management Outcome	The loss of indigenous vegetation on site is minimised and results in no erosion.
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IMPACT MANAGEMENT ACTIONS

Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Demarcate/fence off the construction area. 	Contractor	Construction phase



<ul style="list-style-type: none"> • Erect signage prohibiting access beyond fence line. • The labour must be educated on indigenous and alien species within the site, and surrounding site, as well as the importance and maintenance of the temporary fencing. • Consider search and rescue of bulbs and cuttings of succulents for use in the rehabilitation of disturbed areas within the cemetery footprint (roadside / entrance areas). It must be noted that a Permit is required for SCC removal and rescue. • Development setback buffers to be implemented to avoid watercourses that are also associated with botanical sensitivity. • Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences. • No clearing outside of development and infrastructure footprint area to take place. • The ECO must be present during the clearing of alien invasive plant species and vegetation to ensure the implementation of the proposed mitigation measures and to identify any harmful activities. • Rescued plants should be replanted into a nearby disturbed area of similar habitat or for open space rehabilitation. • A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration. • Final siting of footprint must be undertaken in consultation with respective specialists, including a botanist. • Removed topsoil should be used in rehabilitation of transformed areas that are within the open space areas. • Establish waste receptacles for the disposal of waste during construction. • Identify separate waste receptacles for different waste, identify/label each receptacle. • Ensure these waste receptacles are emptied before overflow. • If the receptacles are not being emptied by the local municipal services, a disposal slip must be obtained and filed in the Environmental File. • Vehicles may not be driven along the eastern boundary of the site, outside of the demarcated working area. • Labour must be advised: <ul style="list-style-type: none"> ○ All fauna, including butterflies, must not be harmed during construction. ○ Fauna must be avoided, and if removal is required due to a potential for harm, professional assistance must be sought. 		
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Performance Indicator	<ul style="list-style-type: none"> • Construction team limit disturbance to the indigenous vegetation as far as possible for the duration of the construction phase. • Indigenous vegetation transplanted successfully and remains in a healthy state. • There is no evidence of erosion.
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11.4 OBJECTIVE 4: PREVENT WATER OR SOIL POLLUTION.

Impact Management Objective: Maintain the hydrological integrity of the watercourse.		
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Contamination to the watercourse and soils. • Change in water quality parameters. • Loss of aquatic Biota. • Contamination of groundwater. 	
Impact Management Outcome	Hydrological integrity of the aquatic systems remains in its current state.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Establish a 32m no-go aquatic buffer. • Construction personnel, equipment and materials must be limited to the minimal practical working area. • All equipment and material storage areas must (if practical, reasonable and feasible) be located at a minimum distance of 100m from the watercourse. The appointed ECO must be consulted in this regard. • Stockpiling area must be located at a minimum distance of 100m from the watercourse. • Position toilets toward the northern portion of the site. • Ensure that the chemical toilets are serviced weekly, by a registered company. • Ensure that following every service, disposal slips are obtained from the registered company to record each service and removal of waste. • Disposal slips must be filed in the environmental file. • At the least, an aquatic impact buffer zone of 32m must be applied. • Outside the working corridor, all watercourses are to be considered no go areas and a 32 m construction buffer must be adhered to. • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. 	Contractor	Construction phase



<ul style="list-style-type: none"> No increase in sediments should be allowed to reach the wetland area. The solid domestic waste must be removed and disposed of offsite. 		
Performance Indicator	<ul style="list-style-type: none"> Watercourse remains in a healthy state of functioning. No evidence of erosion. 	

11.5 OBJECTIVE 5: NOISE IMPACT MANAGEMENT.

Impact Management Objective: To control avoidable noise impacts to the surrounding areas

Potential impact(s) to avoid	<ul style="list-style-type: none"> Avoid unnecessary noise generated during the undertaking of construction activities, which may present a nuisance to surrounding community and negatively impact the Sense of place
Impact Management Outcome	Management of noise emissions to an acceptable level.

IMPACT MANAGEMENT ACTIONS

Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> A noise complaints register must be opened. Excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible. Work on site must be well-planned and must proceed efficiently so as to limit the duration of the disturbance. Vehicles and equipment must be kept in good working condition. If deemed necessary, machinery and equipment should be fitted with mufflers/ exhaust silencers. No unnecessary disturbances must be allowed to emanate from the construction site. Due to the location of the proposed development site to residents, noise levels must be kept to a minimum at all times. If excessive noise is expected on the boundary of the residential erven bordering the site they must be informed in advance of when the high noise levels will occur and for how long they will occur. Workers must be educated on how to control noise-generating activities that have the potential to become disturbances, particularly over an extended period of time. Noise levels must comply with the relevant health & safety regulations and SANS codes and must be monitored by the Health & Safety Officer as necessary and appropriate. Affected parties must be informed of the excessive noise factors. 	Contractor	Construction phase
Performance Indicator	Noise levels on site remain within acceptable standards. No valid noise complaints are received.	



11.6 OBJECTIVE 6: VISUAL IMPACT MANAGEMENT.

Impact Management Objective: To prevent the site from presenting an unnecessary visual impact to the surrounding public.		
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Temporary loss of the sense of place. • Reoccurrence of illegal dumping (especially excavated rock and building rubble) was noted in the southern part of the site. 	
Impact Management Outcome	The site does not present a significant visual impact and the sense of place is maintained during the construction period.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Consult with the ECO when determining the appropriate site for the site camp. • The site camp must be kept neat and tidy and free of litter at all times. • Waste must be managed according to this EMP and the mitigation measures listed above in terms of waste management. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy. • The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Work on site must be well-planned and well-managed so that work proceeds quickly and efficiently, thus minimizing the disturbance time. • The site camp, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Access to the site must be adequately restricted to construction and cemetery personal to avoid illegal dumping of waste. • The site camp may require visual screening via shade cloth or other suitable material. • Special attention must be given to the screening of highly reflective material. • Use of lighting (if required) must take into account surrounding residents and land users and must present little or no nuisance. Downward facing, spill-off type lighting is recommended. • Construction vehicles must enter and leave the site during working hours. • Working areas, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. 	Contractor	Construction phase
Performance Indicator	<ul style="list-style-type: none"> • Good "housekeeping" is evident on site. 	



	<ul style="list-style-type: none"> • The site does not pose a visual impact to surrounding community. • Immediate removal of illegally dumped waste.
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11.7 OBJECTIVE 7: DUST IMPACT MANAGEMENT.

Impact Management Objective: To prevent the generation of significant dust.

Potential impact(s) to avoid	<ul style="list-style-type: none"> • Dust may cause a nuisance to the surrounding residents. • Dust may smother surrounding vegetation. • Decreased visibility for labourers and operators.
Impact Management Outcome	The surrounding environment, land users, residents do not experience significant dust-related impacts.

IMPACT MANAGEMENT ACTIONS

Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Land clearing and earthmoving activities must not be undertaken during strong winds, where possible. • Cleared areas must be provided with a suitable cover as soon as possible, and not left exposed for extended periods of time. • Stockpiles of topsoil, spoil material and other material that may generate dust must be protected from wind erosion (e.g. covered with netting, tarpaulin or other appropriate measures. Note that topsoil must not be covered with tarpaulin as this may kill the seedbank). • The location of stockpiles must take into account the prevailing wind direction and must be situated so as to have the least possible dust impact to surrounding residents, road-users and other land-users. • Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution. • The speed limit must be set at 20-40km/h. • Dust must be suppressed on access roads and the construction site during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of excessive run off. • Dust suppression measures such as the wetting down of sand heaps as well as exposed areas around the site must be implemented especially on windy days. • The use of straw worked into the sandy areas may also help and the ECO must advise when this is necessary. 	Contractor	Construction phase



<ul style="list-style-type: none"> • If dust appears to be a continuous problem the option of using shade cloth to cover open areas may be necessary or the erecting of shade netting above the fenced off area may need to be explored. • All vehicles transporting sand need to have tarpaulins covering their loads which will assist in any windblown sand occurring off the trucks. • Work on site must be well-planned and should proceed efficiently so as to minimise the handling of dust generating material. • Material loads must be properly covered during transportation. • Dust levels specified in the National Dust Control Regulations (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m²/day, measured using reference method ASTM D1739; • A Complaints Register must be available at the site office for inspection by the ECO of dust complaints that may have been received. 		
Performance Indicator	<ul style="list-style-type: none"> • Excessive dust does not arise from the site. • No dust complaints are received from any member of the public. • There is no evidence that vegetation surrounding the site is being smothered by dust. 	

11.8 OBJECTIVE 8: CREATION OF BUSINESS & EMPLOYMENT OPPORTUNITIES.

<i>Impact Management Objective: To create employment opportunities with potential for skills transfer, for members of the local community.</i>		
Potential impact(s) to be promoted.	<ul style="list-style-type: none"> • Labourers (skilled and unskilled) will be able to earn a living. • Labourers (skilled and especially unskilled) can improve/build their skills. • Improved quality of life for these labourers, by establishing an income. 	
Impact Management Outcome	The local community benefits from the employment opportunities created during the construction phase.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Labour should be sourced from the local community. • Materials and services should be sourced from local businesses within the community, as much as possible. 	Hessequa Municipality / Social Consultant	Construction phase
Performance Indicator	<ul style="list-style-type: none"> • The majority of the construction team is from the local community, with preference given to historically disadvantaged individuals. • Skills transfer from experienced to less experienced workers is actively encouraged on site. 	



11.9 OBJECTIVE 9: MINIMISATION OF THE TRAFFIC

Impact Management Objective: To ensure continued safety on access roads during the construction phase.		
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Accidents may occur due to impatient or negligent drivers. • Congestion and delays. 	
Impact Management Outcome	The functioning of the surrounding road network remains efficient and the state of the infrastructure isn't hampered. The safety of surrounding land occupiers and construction site remains intact.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • All construction vehicles must adhere to traffic laws when travelling to and from the site. • All drivers and machinery operators must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic and must exercise due caution when entering/ exiting the site. • Appropriate signage must be erected to warn other road users about the presence of construction vehicles, particularly at the point where construction vehicles enter/ exit the site from the N2. • Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. • Construction vehicles must adhere to the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles. • The Contractor must ensure that any large or abnormal loads (including hazardous materials) that must be transported to/ from the site are routed appropriately, and that appropriate safety precautions are taken during transport to prevent road accidents. • Where possible, construction traffic that may obstruct traffic flow on the surrounding roads must be scheduled for outside of peak traffic times • Provision must be made to ensure children are able to cross Trekker Road safely, in the form of dedicated raised pedestrian crossings. • Where possible, heavy machinery must be parked within a secure demarcated area within the footprint of the site instead of moving the machinery to and from the site each day. 	Contractor	Construction phase
Performance Indicator	<ul style="list-style-type: none"> • The surrounding road networks infrastructure remains in its current state. • Limited congestion and traffic. 	



12. Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase

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

The environmental management objectives (goals) for this phase are:

- Rehabilitate & stabilise disturbed areas and ensure environmentally sensitive closure of the construction sites.
- Reduce loss of aquatic habitat.
- Prevention of flow modification.
- Reduced erosion & sedimentation.
- Prevent contamination of groundwater.
- Prevent vandalism and maintain security.
- Reduce visual impact.
- Reduced traffic.
- Creation of Business and Employment Opportunities.
- Prevent propagation alien invasive species

12.1 OBJECTIVE 1: SITE CLOSURE & REHABILITATION

Impact Management Objective: To rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner.		
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Failure to remove all construction related waste and materials may result in environmental pollution. • Failure to remove all construction related equipment, machinery and site facilities may pose an impact to the natural environment specifically the watercourses. • Failure to stabilise disturbed surfaces may result in soil erosion and increased storm water run-off, which may limit successful revegetation of the site. • Deterioration of ESA and biodiversity network. 	
Impact Management Outcome	<ul style="list-style-type: none"> • The site is neat and tidy and all exposed surfaces are suitably covered/ stabilised. • There is no construction-related waste or pollution remaining on site. 	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Ensure that municipal officials are sufficiently trained on how to conduct post-construction rehabilitation in accordance with Appendix C- Rehabilitation plan. 	Contractor	Construction phase



<ul style="list-style-type: none"> • On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material. • Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the ECO. • Any contaminated soil must be collected and disposed of as hazardous waste. • All construction waste, litter and rubble are to be removed from the site and re-used elsewhere, or recycled/disposed of at an appropriate facility. • Burying or burning of waste or rubble on site is prohibited. • All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped. • Topsoil removed during the establishment of the site camp and the working area must be spread evenly over the entire site camp area and all other disturbed/ exposed areas after those areas have been ripped, scarified, shaped and contoured (as required). • Where necessary seeding and planting of vegetation can take place after the replacement of the topsoil. Hardy, drought tolerant, non-invasive plant species must be selected. If needed, a layer of mulch can be applied to the newly shaped/ landscaped and topsoiled areas. The mulch will serve to limit erosion and will promote the re-vegetation of the site by retaining moisture in the soil and providing organic material (compost) for new plant growth. • All exposed soils and recently topsoiled areas are to be re-vegetated or stabilised to the satisfaction of the ECO, to protect these areas from wind and water erosion. No areas are to be left exposed to erosive forces. Erosion protection measures that can be applied include mulching (described above), the placement of geotextile, onion bags filled with wood chips, brush-packing or other similar measures. • Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and reused elsewhere on the property or disposed of at an appropriate disposal site. • Disturbed soils must be revegetated with the local indigenous vegetation such as that which occurs at the site, or provided with other suitable cover. • Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. • Control aliens on and around the site as a long-term management requirement. • If required by ECO, the Veld area adjacent to the works area must be rehabilitated. 		
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<ul style="list-style-type: none"> • Prohibit further waste dumping in the area. • Consider search and rescue of bulbs and cuttings of succulents for use in the rehabilitation of disturbed areas within the cemetery footprint. • Prior to rehabilitation the ECO must ensure that all identified invasive species, weeds, and foreign material (including waste), must be cleared from site and disposed of at a registered landfill site. • Where necessary weeds should be treated with an acceptable herbicide, with no residual effects (can be recommended by Specialist/ obtain from local nursery). • Site should be ripped/scarified (no more than 50mm apart) to approximately 50mm – 100mm depth. • Turf/seed mix, as recommended by Specialist or sourced from local nurseries under the guidance of the appointed ECO, should be mixed with topsoil and by means of manual labour, spread evenly across the exposed area. • Ensure the soil is kept moist immediately after application of the seed. • Monitoring of site for germination and regrowth is required. • Monitoring of establishment and manual removal of weeds must be undertaken. Where possible, an acceptable herbicide may be used. • The Contractor must implement an effective alien plant removal and control programme 14 days prior to close out. • Cemetery management to incorporate electronic software into management to ensure efficiency and up-to-date record keeping. 		
<p>Performance Indicator</p>	<ul style="list-style-type: none"> • All construction-related materials, equipment, facilities, waste and contaminated soils have been removed from the site. • Compacted soils have been scarified/ ripped and stabilised. • All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised. • No alien vegetation is evident on site. 	

12.2 OBJECTIVE 2: REDUCE LOSS OF AQUATIC HABITAT

<p><i>Impact Management Objective: Reduce loss of Aquatic Habitat</i></p>	
<p>Potential impact(s) to avoid</p>	<ul style="list-style-type: none"> • Loss of aquatic habitat within the watercourse areas. • Establishment of alien invasive species within the riparian zone. • Erosion within the riparian habitat
<p>Impact Management Outcome</p>	<ul style="list-style-type: none"> • Minimal loss of Aquatic Habitat and Associated Biota
<p>IMPACT MANAGEMENT ACTIONS</p>	



Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> Although construction has concluded, the buffer area must still be considered valid, and any activities occurring hereafter, must consider this area as such. The caretaker must be informed of this, and any illegal dumping that may occur, etc, must be reported to the municipality immediately. Signage must be erected, to indicate that dumping is prohibited. Stormwater will be collected and dispersed by means of a proposed stormwater berm towards the East of the site, channeling run-off to an existing low-lying disturbed area which the Engineers propose to be formalized into a stormwater detention area. The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area. The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area. Should accidental disturbance take place close to or within the watercourse, guidelines for rehabilitation of aquatic habitats are provided. The plan must promote the re-establishment of the ecological functioning of any area disturbed by construction activities. Also consult WET-RehabEvaluate, WET-RehabMethods (Cowden and Kotze, 2009), and the river rehabilitation manual developed by Day et al. 2016, for further information. The establishment and infestation of alien invasive plant species must be prevented, managed and eradicated in the areas impacted upon by the project. Maintenance must ensure that no solid waste is left on site that can be washed down or blown into the aquatic habitat. 	Developer	Operational phase
Performance Indicator	<ul style="list-style-type: none"> All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised. A healthy aquatic habitat Minimal waste within the aquatic habitat Minimal alien vegetation present 	

12.3 OBJECTIVE 3: PREVENTION OF FLOW MODIFICATION.

<u>Impact Management Objective: No Impairment of Surface Water Quality</u>	
Potential impact(s) to avoid	<ul style="list-style-type: none"> Deteriorated aquatic habitat.



	<ul style="list-style-type: none"> • Increased erosion. • Loss of ecosystem functioning. 				
Impact Management Outcome	<ul style="list-style-type: none"> • No impairment of surface water quality as a result of the development. 				
IMPACT MANAGEMENT ACTIONS					
Mitigation measure	<table border="1"> <thead> <tr> <th>Responsible party</th> <th>Time period</th> </tr> </thead> <tbody> <tr> <td>Developer</td> <td>Operational phase</td> </tr> </tbody> </table>	Responsible party	Time period	Developer	Operational phase
Responsible party	Time period				
Developer	Operational phase				
Performance Indicator	<ul style="list-style-type: none"> • No visible signs of erosion. • Aquatic ecosystem remains healthy and functioning. 				

12.4 OBJECTIVE 4: REDUCED EROSION & SEDIMENTATION.

<i>Impact Management Objective: Reduced impact on aquatic features caused by erosion & sedimentation.</i>					
Potential impact(s) to avoid	<ul style="list-style-type: none"> • Increased sedimentation of downstream watercourses as a result of soil erosion problems and bank instability. • Creation of preferential flow paths. 				
Impact Management Outcome	<ul style="list-style-type: none"> • Prevention of excessive sediment entering the watercourse. 				
IMPACT MANAGEMENT ACTIONS					
Mitigation measure	<table border="1"> <thead> <tr> <th>Responsible party</th> <th>Time period</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Responsible party	Time period		
Responsible party	Time period				



<ul style="list-style-type: none"> Stormwater will be collected and dispersed by means of a proposed stormwater berm towards the East of the site, channelling run-off to an existing low-lying disturbed area which the Engineers propose to be formalized into a stormwater detention area. The volume and velocity of stormwater runoff must be reduced through the discharge of the surface flow at multiple locations, preventing erosion, therefore accumulated stormwater will be dispersed by means of an overflow channel to minimize the effect of peak runoff downstream. The proposed detention pond will act as energy dissipater. Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area. In-situ stormwater management is proposed within the internal road network, and outer stormwater berms are proposed. Stormwater will be collected and dispersed by means of a proposed stormwater berm towards the East of the site, channelling run-off to an existing low-lying disturbed area which the Engineers propose to be formalized into a stormwater detention area. Ensure stormwater berms are maintained along the outer edge of the proposed site. Accumulated stormwater will be dispersed by means of an overflow channel to minimize the effect of peak runoff downstream. The proposed detention pond will act as energy dissipater. The encroachment of any further infrastructure or vehicles into the aquatic buffer area must be prevented. The volume and velocity of any stormwater runoff must be reduced through discharging the surface flow at multiple locations, preventing erosion. Potential for ponding on site, must be avoided. 	Developer / consulting engineer	Operational phase
Performance Indicator	<ul style="list-style-type: none"> There is no evidence of erosion and the watercourse remains healthy. 	

12.5 OBJECTIVE 5: PREVENT CONTAMINATION OF GROUNDWATER/AQUIFER.

<p><i>Impact Management Objective: Avoid the contamination of groundwater/aquifer caused by the decomposition of human remains, metal corrosion and compounds used during embalming. Implement the Groundwater monitoring and sampling plan.</i></p>		
Potential impact(s) to avoid	<ul style="list-style-type: none"> Contaminated groundwater/aquifer 	
Impact Management Outcome	<ul style="list-style-type: none"> Monitoring results indicate that groundwater/aquifer remains uncontaminated. 	
<p>IMPACT MANAGEMENT ACTIONS</p>		
Mitigation measure	Responsible party	Time period



<p><u>Burial Procedure</u></p> <ul style="list-style-type: none"> • Ensure burial occurs above water table depth to enable natural attenuation in the vadose zone. Harmful bacteria, viruses and pathogens tend to die off during final stages of decomposition and therefore tend not persist in the environment. • Ensure that the Municipal By-Law for Cemeteries and Crematoria, 2008, is implemented accordingly, prohibiting the establishment of graves that exceed 2m's in depth. • Vertical graves may not be established on this site, unless they are in compliance with the Municipal By-Law for Cemeteries and Crematoria, 2008, specifications, and do not exceed 2m's in depth. <p><u>Monitoring</u></p> <ul style="list-style-type: none"> • Monitoring to be followed according to Appendix E- Groundwater monitoring and sampling plan. • Monitoring boreholes are required (minimum of 1 down-gradient) in order to detect any potential contamination as quickly as possible. Potentially use BH4 as down-gradient monitoring point. • Limit groundwater use immediately downgradient of the site. • Implementation of the Proposed groundwater monitoring plan in Appendix E. <p><u>General</u></p> <ul style="list-style-type: none"> • The applicant must advise local Undertakers and Funeral parlours that coffin sizes are to be ideally standardised with ordinary dimensions, if affordable and culturally acceptable. • The applicant must advise local Undertakers and Funeral parlours that coffin materials must primarily consist of affordable wood or biodegradable materials. • The applicant must advise local Undertakers and Funeral parlours to refrain from using excessive ornamental metals, plastics, paints varnishes, etc. • The applicant must advise local Undertakers and Funeral parlours to Undertakers or mortuaries that all jewellery, dentures, pacemakers, watches, excessive cosmetics, and other such materials must be removed prior to burial. Unless it is a cultural necessity. Record of such burials are to be kept in private. • Items containing hazardous materials, such as batteries are not allowed to be buried. • Limit groundwater use immediately downgradient of the site. 	<p>Developer</p>	<p>Operational phase</p>
<p>Performance Indicator</p>	<ul style="list-style-type: none"> • Borehole monitoring results aligned with standardised parameters. 	



12.6 OBJECTIVE 6: REDUCE VISUAL IMPACT.

Impact Management Objective: Reduce the visual impact caused by the proposed expansion.		
Potential impact(s) to be avoided.	<ul style="list-style-type: none"> • Change in the sense of place. 	
Impact Management Outcome	<ul style="list-style-type: none"> • Sense of place for the area is maintained. 	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Rescued flora is to be re-established in disturbed areas, within the site, in accordance with the ECO. Disturbed areas may include roadside areas and entrance to cemetery. • Unnecessary use of lighting must be avoided. • The state of the onsite vegetation must be maintained and kept in a healthy state with on-going alien vegetation removal, in accordance with the Rehabilitation plan in Appendix C. • Collection of refuse must be maintained. • Access to the cemetery must be adequately restricted to authorised personal to avoid illegal dumping of waste. • Infrastructure must be maintained. • Use of unutilised areas within the extent as a green space. 	Developer	Operational phase
Performance Indicator	<ul style="list-style-type: none"> • The proposed expansion contributes to the present sense of place. 	

12.7 OBJECTIVE 7: REDUCED TRAFFIC.

Impact Management Objective: Minimise the impact of traffic and maintain a safe environment.		
Potential impact(s) to be avoided.	<ul style="list-style-type: none"> • The increase of traffic in the area. • Reduced safety on surrounding roads. • Increased carbon emissions. 	
Impact Management Outcome	<ul style="list-style-type: none"> • Surrounding road networks remain safe to use and free of excessive congestion. 	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> • Implement signage to identify the cemetery entrance off of Rooipitijie Road. • To allocate preferred parking areas. • Ensure that sufficient signage and road markings are incorporated into the internal road network. 	Hessequa Municipality	Operational phase



<ul style="list-style-type: none"> Speed breakers must be considered along Rooipitjie Road, as this remains the only access and entry into the cemetery site, and entrance/exit into Melkhoutsfontein settlement, residential properties and sportsfield where it is common for unsupervised kid to be found playing, etc. 		
Performance Indicator	<ul style="list-style-type: none"> Traffic moves freely and road infrastructure remains in a safe condition. 	

12.8 OBJECTIVE 8: PREVENT VANDALISM AND MAINTAIN SECURITY.

Impact Management Objective: PREVENT VANDALISM AND UNAUTHORISED ENTRY TO CEMETERY.		
Potential impact(s) to be avoided.	<ul style="list-style-type: none"> Possible criminal activity. Visitors hesitate to visit cemetery. Caretaker can be at risk. 	
Impact Management Outcome	<ul style="list-style-type: none"> Cemetery remains free of vandalism and a safe environment. 	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> Erect signage detailing prohibited activities. Ensure security is available at the entrance of the cemetery. Ensure that there is only one access point. Access to the site must be adequately restricted to construction and cemetery personal to avoid illegal dumping of waste. Ensure the fence is maintained, any detection of vandalism must be reported immediately. The caretaker must have the contact information for emergency services, and enforcement, as well as the means to report any suspicious activities. Consider fitting boreholes established for water monitoring, with borehole monitoring caps, to secure them while on site. Use of unutilised areas within the extent as a green space. 	Hessequa Municipality	Operational phase
Performance Indicator	<ul style="list-style-type: none"> No evidence of vandalism and no breaches of safety occur. 	

12.9 OBJECTIVE 9: PREVENT PROPAGATION OF ALIEN INVASIVE SPECIES

Impact Management Objective: Areas planned for future grave sites are not infested with alien vegetation.	
Potential impact(s) to be avoided.	<ul style="list-style-type: none"> Encroachment and spread of alien vegetation
Impact Management Outcome	<ul style="list-style-type: none"> Areas planned for future grave sites remain free from alien vegetation.



IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> A suitable cover crop is to be sourced from a local nursery. The cover crop is to be drought resistant and indigenous to the area. Unskilled labourers can be used. It is recommended that periodic alien vegetation clearing is undertaken. Use of unutilised areas within the extent as a green space. Prevent illegal dumping. Ongoing removal of Alien invasive plant species, as described with the Rehabilitation plan in Appendix C. 	Hessaqua Municipality	Operational phase
Performance Indicator	<ul style="list-style-type: none"> Areas planned for future grave sites are not infested with alien vegetation. 	

12.10 OBJECTIVE 10: CREATION OF BUSINESS AND EMPLOYMENT OPPORTUNITIES.

Impact Management Objective: Creation of Business and Employment Opportunities		
Potential impact(s) to be promoted.	<ul style="list-style-type: none"> Long-term/temporary employment available to few members of the local community. Employees earn salaries that will contribute to their quality of life. Multiple opportunities will be created within the site and will ripple out to the surrounding community. 	
Impact Management Outcome	<ul style="list-style-type: none"> Creation of Business and Employment Opportunities. 	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<ul style="list-style-type: none"> The Holder must inform local community leaders, organisations and councillors of the potential job opportunities associated with the different components associated with the operational phase of the development. The use of the Green space for community gatherings and associated events recreational activities should be considered. 	Hessequa Municipality	Operational phase
Performance Indicator	<ul style="list-style-type: none"> Increase in employment of local residents. 	



13. Emergency Preparedness

13.1 Emergency response procedures

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

- The construction contractor is responsible for identifying potential significant environmental risks that may arise as a result of pre-construction, construction and rehabilitation activities, and the contractor must formulate emergency response procedures for these potential incidents.
- The ECO, the Contractor and the Holder are responsible for ensuring that all construction workers are aware of the emergency procedures and have been inducted on how to identify and respond to an emergency incident during construction.
- An emergency procedure must clearly indicate who will take charge during an emergency, and the roles and responsibilities of workers and authorities during an emergency.
- The construction contractor is responsible for ensuring that the requirements of the Occupational Health & Safety Act (OHSA) are adhered to during the construction phase. The Holder is responsible for ensuring compliance with the OHSA during the undertaking of maintenance activities.

13.2 Emergency preparedness

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

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

14. Method statements

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

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

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

- Establishment of site camp and stockpile area.
- Cement/ concrete batching, disposal and emergency contingencies.
- Topsoil and sub-soil storage/ stockpiling.
- Storage of fuels and hazardous chemicals and emergency contingencies.
- Waste management system.
- Storm water management and control.
- Fire Control & Fire Emergency Plan.
- Emergency preparedness plan / emergency response procedure (see Chapter 14).
- Post-construction rehabilitation.

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

15. Roles and Responsibilities

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

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

Duty of Care:

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

15.1 Duties and Responsibilities of the EA Holder.

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

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

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

15.2 Duties and Responsibilities of the Contractor

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

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

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

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

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

15.3 Duties and Responsibilities of the ECO

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

15.3.1 Competency of the ECO

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

15.3.2 Duties of the ECO

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

- Conduct a pre-construction site inspection to ascertain the pre-commencement condition of the site (i.e. the status quo);
- Conduct an environmental awareness induction;
- Undertake regular site visits to monitor compliance with all mitigation, monitoring and management measures contained in the EMPr and the Environmental Authorisation, during the pre-construction, construction and rehabilitation phases of the development;
- Evaluate the achievement of the performance indicators associated with each impact management objective specified in this EMPr;
- Liaise with site contractors, engineers and other members of the development team with regard to the requirements of the EMPr;
- Examine method statements, where required;
- Furnish contractors with verbal warnings through the Holder / Engineer in case of contravention of the EMPr;
- Recommend that the competent authority furnish errant contractors with predetermined fines, when verbal and / or written warnings are ignored;
- Keep detailed records of all site activities that may pertain to the environment, and produce compliance-monitoring reports / Environmental Monitoring Reports (EMR) for submission to the Holder, and the Competent Authority at regular intervals during the construction phase;
- All EMR Reports and Inspection Reports must be submitted at the end of each month to the Holder, Competent Authority and Environmental Auditor.

15.3.3 Frequency of ECO visits

The ECO must conduct weekly to fortnightly site visits during the construction phase, in addition to the start-up and closure inspections.

The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

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

15.3.4 Authority of the ECO

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

The ECO has the authority to report incidents of non-compliance to the Competent Authority at any time.

15.4 Environmental Auditor

An environmental auditor is to be appointed by the applicant. As per Section 34 of the EIA Regulations (GN R326 of 2017), the duty of an Environmental Auditor is to be independent and is responsible for:

- Ensuring compliance with the conditions of the environmental authorisation and the EMPr; and
- Submit an environmental audit report to the relevant competent authority, which provides verifiable findings, in a structured and systematic manner, as per Appendix 7 of GN R326.

The Environmental auditor must undertake an audit as per Appendix 7 of GN R326 at the following stages;

- At 50% completion of the project timeline.
- At practical completion of the construction period.
- 3 months after practical completion of the construction period.
- Once a year, for the following 5 years after practical completion of the construction period.

Audit report is to be submitted to the Competent Authority and Holder no later than 2 weeks after an audit has been conducted.

16. Environmental Awareness Plan

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

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

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

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

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

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

17. Monitoring, Record Keeping and Reporting

17.1 Environmental Auditing

In accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (as amended), the Holder of the Environmental Authorisation must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The Holder is responsible for appointing, managing and remunerating the appointed auditor. The auditor may **not** be the appointed Environmental Control Officer (ECO).

The appointed auditor must undertake regular environmental audits every 6 months or according to the frequency specified in the Environmental Authorisation. Following each audit, the environmental auditor must submit an audit report to the Competent Authority (in this instance the DEA&DP).

- Environmental auditing and environmental audit reports must adhere to the requirements of the amended 2014 Environmental Impact Assessment Regulations, in particular Section 34 (*Auditing of Compliance with Environmental Authorisation, Environmental Management Programme*) and Appendix 7 (*Objective and Content of Environmental Audit Report*)
- The audit report must provide verifiable findings on the level of compliance with the provisions/conditions of the Environmental Authorisation and the EMPr, and must also comment on the ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.
- Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

17.2 Construction phase monitoring, reporting and record keeping

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

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

17.2.1 ECO Inspections - Photographic Records

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

17.2.2 ECO Inspections - Written Records

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

- The ECO must complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Holder, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The

monthly reports must be a summary of the ECO inspections from the preceding month, and must highlight the key concerns/ issues on site, instances of non-compliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.

- All ECO reports and ECO instructions must be retained on file at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority must request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations must be clearly documented and filed on a master file off-site for safe keeping.
- It is recommended that a site register (incident register) be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents must also be recorded.
- A complaints register must be kept on site in which complaints by any member of the public must be logged.
- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

17.2.3 Construction Phase Record Keeping

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

18. Penalties, Claims and Damages

The approved EMPr will be included in the final tender document, it will therefore form a part of the tender document which is accepted by the successfully appointed Contractor, ensuring that the Contractor accepts responsibility for onsite compliance, and should the contractor digress, they will be held liable for any fines/damages/penalties as per non-compliance with this document or the associated Environmental Authorization, and environmental permits approved for this project. This will indicate that the Contractor accepts responsibility for all costs incurred in the rehabilitation of the site and for ensuring that all procedures required to rehabilitate the site are implemented. If third parties are called to the site to perform clean up and rehabilitation procedures, the contractor will be responsible for all costs. The competent authority may impose penalties on the Holder or any of the contractors if conditions contained in this EMPr are contravened. This would be based on an agreement or contract between the Holder and the contractor.

Penalties could be imposed in terms of Chapter 11 of the Western Cape Bill on Planning and Development as published in the Extraordinary Provincial Gazette No 5183, 3 October 1997, and would be applicable for any action which leads to damage to the natural environment. Please note that the

payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

In cases where severe environmental damage occurs, the competent authority law enforcement division may take legal action against the responsible parties. The reasons for this could include, among others:

- Not implementing the conditions of the EMPr;
- Spillage that result in environmental damage;
- Incorrect handling and storage of construction materials and chemicals;
- Sensitive areas that are not clearly demarcated;
- Performing ablutions in areas other than facilities provided for such actions; and
- Occurrence of unattended and out of control fire.

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ECO recommend a penalty / fine as described in the following section.

The following fine structure shall apply:

Table 3: Fines and Offences.

Finable Transgression	Min Fine	Max Fine
Failure to notify the ECO of the commencement of construction or pre-construction activities, prior to the commencement of such activities.	R1 000	R2 000
Failure to comply with the provisions relating to the demarcation of the working area, site camp and associated facilities, and the maintenance of the demarcated boundaries.	R1 000	R5 000
Failure to comply with the provisions relating to the demarcation of all "no-go" areas, and the maintenance of the demarcated boundaries.	R2 000	R5 000
Failure to provide secured ablution facilities (1:30 ratio) on site.	R500	R15 000
Failure to comply with the provisions relating to the clearance of vegetation on site.	R2 000	R5 000
Clearance of indigenous vegetation (regardless of the density of alien vegetation present) outside of the demarcated boundaries of the working area and site camp.	R2 500	R15 000
Failure to apply appropriate herbicide (in consultation with the ECO) to alien vegetation when required to do so.	R500	R2 000
Failure to adhere to designated access routes and/or the driving of vehicles through undeveloped vegetation outside of the demarcated working area or site camp.	R1 000	R5 000
Movement of vehicles and/or construction workers in no-go areas;	R1 000	R10 000

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Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, within designated "no-go" areas.	R1 000	R10 000
Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, outside of the areas demarcated for such parking/storage.	R500	R5 000
Failure to comply with the provisions relating to the management of topsoil and subsoil.	R1 000	R5 000
Excessive excavation of material in areas not depicted for such purpose / activity on the approved design plans.	R2 500	R10 000
Failure to comply with the provisions relating to waste management on site i.e. recycling of wastes.	R500	R5 000
Failure to comply with the provisions relating to the storage, use and management of hazardous substances and fuels on site and/or the spillage of hydrocarbons or hazardous substances on site leading to environmental damage.	R1 000	R10 000
Mixing cement or concrete on bare ground and/or failure to comply with any other provision regarding cement/ concrete batching.	R1 000	R5 000
Failure to provide adequate fire-fighting equipment (in working order) on site at all times and/or failure to comply with the provisions relating to fire prevention and/or the occurrence of unattended or out of control fires.	R500	R5 000
Refuelling of vehicles, machinery or equipment outside of the designated refuelling area.	R500	R2 000
Maintenance of vehicles, machinery or equipment outside of the designated maintenance yard, except in emergencies.	R500	R2 000
Failure to undertake refuelling or repairs over a drip tray or other impermeable bunded surface to collect spilled hydrocarbons (fuels, lubricants, oils etc.) and other hazardous substances; failure to provide drip trays under fuel burning equipment (including pumps and generators) where there is a risk of hydrocarbon leakage.	R500	R2 000
Failure to produce a required method statement/s to the engineer's and ECO's satisfaction prior to undertaking the activity concerned and/or failure to adhere to an approved method statement.	R1 000	R5 000

The above does not absolve the transgressor from being prosecuted in terms of the **National Environmental Management Act (Act 107 of 1998)** which may result in further penalties and other actions by State Departments.

19. Conclusion

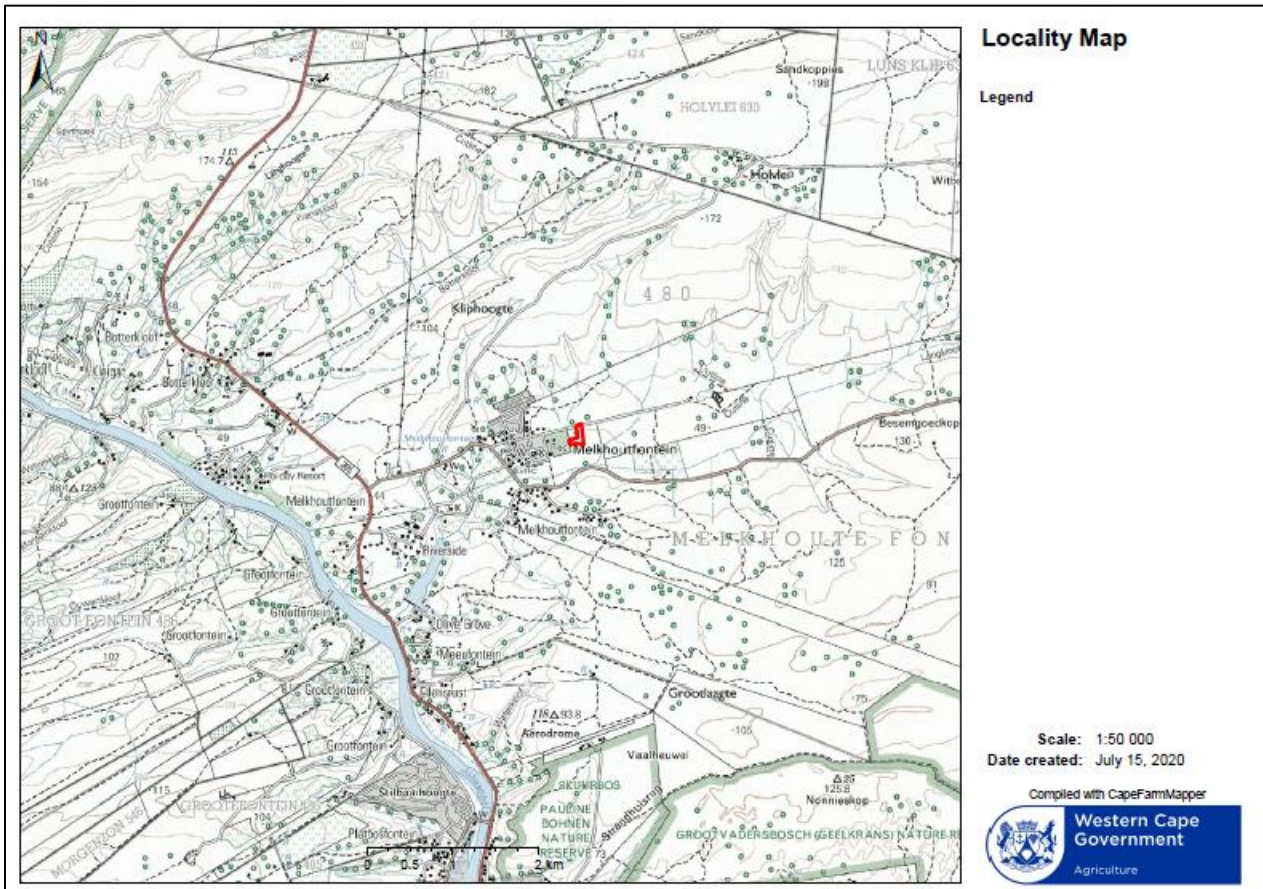
The recommendations and mitigation measures prescribed in this EMPr have been formulated with the intention of addressing potential pre-construction, construction and operational phase impacts on the environment. It is likely that if the conditions, requirements and recommendations of the above EMPr are implemented as described and the relevant stakeholders adhere to the various mitigation measures, then the project will be completed without unforeseen negative environmental impacts.

Familiarity with the contents of this EMPr by the contractors and other individuals involved in the development project will assist in achieving “environmental best-practice”, which ultimately ensures that the project arrives at a sustainable outcome.



20. List of Appendices

Appendix A: Location Maps



Appendix B: Site layout plans.



Appendix C: Rehabilitation plan.

Rehabilitation Plan

Pre-Construction phase

During pre-construction, a search and rescue operation must be conducted by the contractor and assisted by the ECO in areas where clearance is proposed, a CapeNature permit is required if any SCC have established.

With assistance provided by the ECO, indigenous plant species situated within areas to be cleared are to be rescued and stored by the contractor within a temporary nursery on site.

Great care is to be taken when removing the plant, the following actions are to be followed;

- Prior to removal, the plant is to be watered down to loosen soil.
- Once the water has infiltrated, a spade or other digging tool is to be used to excavate the plant, while keeping the roots intact. This is done by digging around and under the plant (as seen in the image below), ensuring that the plant is removed in a cautious manner.



Rescued plants must be planted into a suitable container with excavated topsoil and housed within a temporary nursery on site or immediately planted into the target habitat. If planted into natural habitat, it must be protected from construction activities and monitored to ensure survival. The temporary nursery is to be situated in an area approved by the ECO. This area must ideally be outdoors, shaded, out of the prevailing wind direction, away from any construction and on a flat gradient. Rescued flora to be sprayed with water daily.

For all plants that are rescued, relevant information must be collected, as is determined by the ECO as being adequate for reporting and monitoring. This information could include the number of individuals/clumps and date collected, as well as where they came from.

The following indigenous vegetation species have been recorded on site and are to be incorporated into the search and rescue operation:

- *Osteospermum moniliferum* b



o *Metalasia muricata*



o *Seriphium plumosum*



o *Helichrysum patulum*



o *Searsia glauca*



- *Olea europaea*



- *Leucospermum praecox*



- *Muraltia spinosa*



- *Chironia baccifera*



- *Solanum linnaeanum*



- *Withania somnifera*



- Spreading succulents recorded include

- *Carpobrotus edulis*



- *Mesembryanthemum parviflorum*



- o *Conicosia pugioniformis*



- Where reinstatement is not possible, an indigenous turf/seed mix should be recommended by or sourced under the guidance of the appointed ECO. Materials must be sourced from local nurseries.

Construction phase

The ECO must inspect all plant materials weekly to locate any diseased or insect pest infestations or weeds. If any are identified, appropriate control measures must be applied. Construction activities are to take place within the project area.

Post Construction phase

Prior to rehabilitation, the ECO must ensure that all identified invasive species, weeds, and foreign material (including waste), must be cleared from site and disposed of at a registered landfill site. Ensure that municipal officials are sufficiently trained on how to conduct post-construction rehabilitation.

Invasive plant species recorded (albeit in low numbers) include:

- *Acacia cyclops* (rooikrans)



- *Opuntia ficus-indica* (prickly pear)



- *Verbesina encelioides* (wild sunflower)



The contractor, with the ECO's assistance, is to ensure that all alien invasive plants are removed from site and disposed of at a registered landfill, preferably on the same day as removal. Removed alien invasive plants are not to be stored on site.

The following method is to be used when removing alien invasive plants:

- The contractor, with the ECO's assistance, is to identify and demarcate the alien invasive plant species to be removed. A register is to be created.
- To the best of one's ability, the plant should be removed from the base of the stem, with the root system intact. If the plant is dislodged from the root system, the root system is to be dug out and disposed of with the rest of the plant.
- Care is to be taken to ensure that the plant does not disperse any seeds when removed.
- Disturbed soil compacted and replaced with excavated topsoil.
- If manual removal is not possible, a herbicide is to be considered, in consultation with the ECO.
 - The herbicide must be selective and non-residual in nature and applied only by a licensed operator if necessary (can be recommended by specialist/municipal environmental manager obtain from local nursery).

Reinstatement of rescued indigenous Flora

Once alien invasive plant species have been removed, the contractor, with the assistance of the ECO, must reinstate the rescued plants. The following conditions are to be taken into account when reinstating:

- The seasonal planting period for the project location is between March and June.
- Areas for which plants will be reinstated are to be areas within the project area that have been previously disturbed.
- The area is to be watered prior to reinstatement and a suitably sized hole manually excavated.
- The plant is to be reinstated and provided with previously excavated topsoil.

- If required, an indigenous turf/seed mix, as recommended by Specialist or sourced from local nurseries under the guidance of the appointed ECO, must be mixed with topsoil and by means of manual labour, spread evenly across the exposed area. Ensure the soil is kept moist immediately after application of the seed.
- Where necessary, geofabric must be applied to contain newly laid soil.
- Fertilizer:
 - An acceptable fertilizer/compost must be chosen under the guidance of the approved ECO, sourced from local nurseries/stores, and utilized during rehabilitation.
 - The fertilizer/compost is to be distributed evenly and worked into topsoil.
- Daily watering of reinstated plants will be necessary thereafter (short term)
- Monitoring of reinstated plants and growth of seed is required.

Operational Phase.

Monitoring of establishment and manual removal of weeds must be undertaken. Where possible, an acceptable herbicide may be used.

The rehabilitation of the site must ensure that the final conditions of the site is environmentally acceptable and that there will be no adverse long-term effects on the surrounding environment especially the water resources.



Appendix D: EAP CV

CURRICULUM VITAE

AMEESHA SANKER

PERSONAL

Profession: Environmental Assessment Practitioner, Sharples Environmental Services cc, Cape Town.

Nationality: South African

Date of Birth: 27 December 1990

Languages: English (read, write and speak) - Fluent

Marital Status: Single

Drivers License: Code B

Health: Excellent

WORK EXPERIENCE

March 2020 – Present: Sharples Environmental Services cc, Cape Town, WC
Environmental Assessment Practitioner

- Basic Assessments Reports
- Amendment Applications
- Administration.

July 2014 – March 2020: Dartingo Consulting Engineers (Pty) Ltd, Durban, KZN
Part-time GIS Technician

- Management and compilation of GIS database.
- Layout/map creation.

June 2013– March 2020: EnAq Consulting.cc
Environmental Assessment Practitioner

- Basic Assessment Applications
- Water Use License Applications
- Environmental Monitoring/Auditing
- Stakeholder Engagement
- Reporting
- Environmental Management Plans
- Public /Contractor Awareness Training/Induction



- Biodiversity Offsets
- Rehabilitation_Protected Areas
- Project Management
- GIS management
- Administration

TERTIARY EDUCATION

2019: UNISA

- I hold a Bachelor of Science Honours Degree specialising in Environmental Management.

2014: University of Kwa-Zulu Natal

- I hold a Bachelor of Science Degree specialising in Geological Science.

PROJECTS

Sharples Environmental Services.cc

2020-George Groenkloof Ontwikkelings (Pty) Ltd

- Partial completion of the Amendment for the Proposed Development of a Retirement Village and Associated Infrastructure on Portion 3 of the Farm Kraaibosch 195, George, Western Cape.

2020-Wittedrift The Home Market NPC

- Completion of the Basic Assessment Report for the Proposed Retirement Village and Service Infrastructure on Erf 103, 104 and a Portion of Rotterdam Street. Wittedrift, Bitou Municipal Area, Western Cape.

2020-Mossel Bay Mossel Bay Local Municipality

- Basic Assessment Report for the Proposed Construction of Walvis Street, Western Cape.

2020-Beaufort West Beaufort West Local Municipality

- Basic Assessment Report for the Expansion of the Existing "Goue Akker" Cemetery in Beaufort West, Beaufort Local Municipality, Western Cape.

Previous Employment (2013 – 2020)

Margate Ugu District Municipality

- BAR, WULA, GIS and ECO for the Proposed Southern Mains Bulk Water Upgrade: Gamalakhe to Margate, Ugu District Municipality, KZN.

Port Shepstone Ray Nkonyeni Local Municipality

- Project screening, assistance with BAR preparation, public participation, GIS and ECO for the proposed Acacia Road Storm Water Network Update, Ray Nkonyeni Local Municipality, KZN.

Ixopo Harry Gwala District Municipality

- Project screening, assistance with BAR preparation, and GIS for the Upgrade of Ixopo Sewer Network, Harry Gwala District Municipality, KZN.

KwaDukuza KwaDukuza Local Municipality

- Project screening, EMPr preparation and ECO for the KwaDukuza Beach Upgrades: Life- Guard and Ablution Facilities, KwaDukuza Local Municipality, KZN.

KwaDukuza KwaDukuza Local Municipality

- Project screening, EMPr preparation and ECO for the A/C Mains Replacements, KwaDukuza Local Municipality, KZN.

Mzumbe Mzumbe Local Municipality

- Project screening, BID and Public Participation for the Proposed Mzumbe Access Road Upgrades, Mzumbe Local Municipality, KZN.

uMtumvuna Ray Nkonyeni Local Municipality

- Project screening, Public Participation and BID for the Proposed uMtamvuna Water Treatment Works Upgrade, Ray Nkonyeni Local Municipality, KZN.

Mkholombe Ray Nkonyeni Local Municipality

- Project screening for the Proposed Upgrade of Mkholombe Sewer Network Upgrade, Ray Nkonyeni Local Municipality, KZN.

Phoenix Ethekewini Municipality

- Project screening, Assistance with the initiation of the Section 24G for the Viewhaven Housing Development, Ethekewini Municipality, KZN.

Margate Ugu District Municipality

- Project screening, and application for Amendment to the Margate Sewer Pipeline Replacement: Upgrade of Pump Station 3A and the Augmentation of Margate Effluent Main, Part 1 & 2, Ugu District Municipality, KZN.

Ballito Siza Water

- Project screening, initiation of BID and WULA for the Ballito Hills Water and Sanitation, KwaDukuza Local Municipality, KZN.

Mzumbe Umzumbe Local Municipality

- Project screening for the Proposed Construction of Ward 20 Community Hall, Umzumbe Local Municipality, KZN.
- Project screening for the Proposed Construction of R102 Bus Shelters, Umzumbe Local Municipality, KZN.
- Project screening for the Proposed Construction of Dweshula Community Hall, Umzumbe Local Municipality, KZN.

Appendix E: Groundwater monitoring and sampling plan.

It is recommended that groundwater monitoring be undertaken at the proposed site in accordance with guidelines set out in the publication by DWAF (1998). The various aspects of the monitoring are presented in this section, along with relevant recommendations.

General
<p>It is recommended that the Pz_2 and two sources of groundwater (BH4 and SPR01) be utilised for regular monitoring. This will allow for monitoring of the groundwater quality and groundwater levels across the site. The water levels and the groundwater quality should be monitored quarterly, so as to determine seasonal fluctuation. The development of a groundwater monitoring programme will be important for assessing any impacts of the site on groundwater and the environment.</p> <p>It is recommended that groundwater monitoring be undertaken at the proposed site in accordance with guidelines set out in the publication by DWAF (1998). The various aspects of the monitoring are presented in this section, along with relevant recommendations.</p>
Groundwater levels
<p>Groundwater level measurements are recommended for the monitoring borehole at the study site. A dip meter can be used to measure the water level below the top of the borehole collar/casing height (mbch). The height of the collar/casing height must then also be measured (m). The water level (metres below ground level (mbgl)) can then be calculated by subtracting the collar/casing height from the water level (mbch). The value must be recorded along with the date and time of measurement.</p>
Sampling process
<p>The monitoring borehole should be assessed to determine whether it is a low or high yielding borehole before sampling. Should the monitoring borehole be of low yield and unable to pump with a conventional pump (until field parameters stabilize and a sample collected), a bailer (grab) sample can be collected. It is preferable to use a low volume sampling pump in most monitoring boreholes (known as a bladder pump).</p> <p>For a high yielding borehole, it is recommended that the pump be installed either half a meter above the bottom of the borehole or at the highest yielding fracture depth. The groundwater should be pumped into a flow-through cell, an EC and pH probe should be placed into the flow-through cell and be pumped until field chemistry parameters stabilise prior to sampling.</p>
Sample Collection, Preservation and Submission
<p>Sample bottles must be labelled with the borehole name, site name and date. At the time of sampling field, chemistry parameters must be measured and recorded. These</p>



include electrical conductivity (EC), oxidation reduction potential (ORP), pH, temperature and dissolved oxygen (DO). Samples must be taken in their correct sampling container and preserved in the correct manner prior to submission to an accredited laboratory for the analysis parameters. The sample method and preservation must be discussed with the laboratory prior to sampling.

Sampling frequency and parameter analysis

In order to best understand and monitor the site, it is recommended that quarterly water level measurements be taken (to determine seasonal fluctuation). It is however, considered adequate for boreholes to be sampled bi-annually. The table below indicates the potential parameters for ongoing monitoring.

Source Activity Category	Cemetery Parameter
Inorganic	pH, EC, K, Cl, NO ₃ , NH ₄ , P, Na, Ca, HCO ₃
Metals	Fe, Mn, Ti, Cr, Cd, Pb, Ni
Organic (and indicator analysis)	BOD, COD, total coliforms, E coli.

