

Upgrade and Extension of the Macassar Wastewater Treatment Works

Environmental Management
Programme

Submission date: 2025/02/19

Document number: 1001780-0000-SPE-OD-00001

Revision: 2



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Making progress possible. Together.

Document control record

Document prepared by:

Zutari (Pty) Ltd

Reg No 1977/003711/07

1 Century City Drive
Waterford Precinct
Century City
Cape Town

South Africa

PO Box 494
Cape Town
8000
Docex: DX 204

T +27 21 526 9400

E capetown@zutari.com

Document Control						
Project name		Upgrade and Extension of the Macassar Wastewater Treatment Works				
Document number		1001780-0000-SPE-OD-00001	Project number		1001780	
Client		City of Cape Town				
Client contact		City of Cape Town: Wastewater Branch	Client reference			
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
0	2024/03/15	Issued for Tender	Tamryn Johnson	Corlie Steyn		Wynand Loftus
1	2024/12/10	Addendum to Final BAR	Tamryn Johnson	Corlie Steyn		Wynand Loftus
2	2025/02/19	Addendum to Final BAR	Tamryn Johnson	Corlie Steyn		Wynand Loftus
Current revision		2				
Approval						
Author signature				Approver signature		
Name		Tamryn Johnson		Name		Wynand Loftus
Title		Senior Environmental Consultant		Title		Manager

All rights reserved | The information contained herein is confidential and proprietary to Zutari and/or its business partners. It may include personal information of data subjects connected to Zutari and/or our business purpose. To safeguard the information and the competitive position of information owners, the content hereof shall not be used, disclosed, or otherwise processed for any purpose other than the purpose for which it was developed. Users can only rely on the accuracy of the final version of the Report. Processing and disclosure of information is subject to our **Privacy Notice** and users indemnify Zutari against the consequences of unauthorised use or disclosure. Any concerns may be addressed to the **Zutari Information Officer**.

Contents

1	BACKGROUND INFORMATION & OVERVIEW	9
1.1	Introduction	9
1.2	Structure of this document	9
1.3	Background	10
1.4	Site Description	10
1.4.1	Site locality	10
1.5	Description of relevant biophysical environment	12
1.5.1	Vegetation	12
1.5.2	Aquatic Ecosystems	13
1.5.3	Protected areas	15
1.5.4	Fauna	15
1.5.5	Cultural and historical resources	16
1.6	Proposed works	16
1.7	Legal framework	16
1.7.1	National Environmental Management Act 107 of 1998 (NEMA)	16
1.7.2	National Water Act	18
1.7.3	Other legislation	18
1.8	Purpose of the EMPr	19
2	CONTRACTING TEAM	20
2.1	Role-players	20
2.1.1	The Employer	20
2.1.2	Engineer	20
2.1.3	Engineer's Representative (ER)	20
2.1.4	Contractor	20
2.1.5	Environmental Manager (EM)	20
2.1.6	Environmental Control Officer (ECO)	21
2.1.7	Environmental Officer (EO)	21
3	ENVIRONMENTAL MANAGEMENT PLAN	22
4	COMPLIANCE	60
4.1	Penalties	60
4.2	Collection and management of fines	61
4.3	Auditing and reporting of fines	62
5	CONCLUSION	62

Appendices

APPENDIX A

Method Statement Template

APPENDIX B

Construction Personnel Information Poster

APPENDIX C

Final Layout and No – Go Maps

APPENDIX D

Chance Finds Procedure - Heritage Western Cape (HWC)

Figures

Figure 1: Locality Plan of Macassar WWTW

Figure 2: Location of Critical Biodiversity Areas at and surrounding the development site.

Figure 3: Location of proposed infrastructure in relation to wetland areas on site.

Figure 4: Location of the development site in relation to Protected Areas.

Tables

Table 1: Environmental Impact Assessment Regulations 2014 (as amended)

Table 2: Environmental management / mitigation measures

Table 3: Proposed programme of activities for the rehabilitation of historically disturbed areas
at the Macassar WWTW

Table 4: Penalties for transgressions imposed on the Contractor

Definitions

For the purposes of this **Environmental Management Programme (EMPr)** the following definitions shall apply:

Alien (species) – (a) a species (plant or animal) that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

Auditing – A systematic, documented, periodic and objective evaluation of how well the environmental management programme is performing with the aim of helping to safeguard the environment by facilitating management control of which would include meeting regulatory requirements.

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

Contaminated water – Water contaminated by the Contractor's activities such as with hazardous substances, hydrocarbons, paints, cement, concrete, silt, solvents and runoff from plant, workshop or personnel wash areas.

Contractors camp & designated material yards / site camps – In the context of this document refers to the location and layout of any storage containers, fuel storage areas and protection bunds, material lay-down areas, hazardous chemical storage facilities, wash bays, workshops and plant service and maintenance areas, oil separators and grease traps, first aid facilities, training facilities, central waste storage areas, and any other facilities associated with the Contractor's camp (as may be applicable).

Dust – Any material composed of particles small enough to pass through a 1 mm screen and large enough to settle by virtue of their weight into a sampling container from the ambient air.

Environment - The surroundings within which humans exist and that are made up of –

- a) the land, water and atmosphere of the earth;
- b) micro-organisms, plant and animal life;
- c) any part or combination of a) and b) and the interrelationships among and between them; and
- d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact Assessment – Submitted to the Competent Authority (Department of Environmental Affairs and Development Planning in the Western Cape) in terms of Regulations pursuant to the National Environmental Management Act, No. 107 of 1998. It is a process that evaluates the environmental and socio-economic characteristics of proposed projects and the consequences of the project on the environment and the people that live in the area affected by the project activities. Where negative impacts are likely to result from the project, measures can be recommended to avoid or lessen these impacts to a level where the impacts are considered environmentally and socially acceptable. Where positive impacts are likely to result from the project, measures can be recommended to increase these impacts. The EIA process also provides interested and affected parties (I&APs) with an opportunity to comment on the project and to be kept informed about decisions that may affect them or the environment.

Environmental Incident – An accident or unexpected occurrence related to the project, including (but not limited to) runaway fires, pollution events and spills, unplanned explosions, major emissions or erosion events, or bank collapse leading to serious or potentially serious negative environmental impacts.

Construction Environmental Management Plan – Prepared in terms of Regulations pursuant to the National Environmental Management Act, No. 107 of 1998. It is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction of a project are prevented; and that the positive benefits of the project are enhanced.

Erosion – The loss of soil through the action of water, wind, ice or other agents, including the subsidence of soil.

Heritage Resource – Any place or object of heritage significance i.e., of archaeological, palaeontological, cultural, aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance.

Incidents – are defined as unplanned events with undesirable consequences. The consequences of such incidents may result in human injury, environmental damage or asset loss. ‘Near misses’ are extraordinary events that could have reasonably resulted in an incident.

Method Statement – A written submission by the Contractor to the Employer’s Agent in response to the EMP or a request by the Employer’s Agent, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, in such detail that the Employer’s Agent is enabled to assess whether the Contractor’s proposal is in accordance with the Scope of Work and/or will produce results in accordance with the EMP.

Mitigation – Measures designed to avoid, reduce or remedy adverse impacts.

Monitoring – The repetitive and continued observation, measurement and evaluation of environmental criteria to follow changes over a period of time and to assess the efficiency of control measures.

Pollution – Any change in the environment caused by (a) substances, (b) radioactive or other waves; or (c) noise, odours, dust or heat; emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

Reasonable – Unless the context indicates otherwise, reasonable in the opinion of the relevant environmental authority.

Solid waste – All non-liquid waste including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g., plastic packets and wrappers).

Subsoil – The soil horizons between the topsoil horizon and the underlying parent rock.

Topsoil – The upper soil profile irrespective of the fertility appearance, structure, agriculture potential, fertility and composition of the soil, usually containing organic material and which is colour specific.

Waste – Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of the National Environmental Management: Waste Act (No. 59 of 2008). There are two main types of waste as follows:

General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes-

- a) domestic waste;

- b) building and demolition waste;
- c) business waste; and
- d) inert waste;

Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment;

Watercourse –

- a) a river or spring,
- b) a natural channel in which water flows regularly or intermittently,
- c) a wetland, pan, lake or dam into which, or from which, water flows.

Working area – any area within the boundaries of the Site where construction is taking place.

Abbreviations

The following abbreviations occur in this Construction Environmental Management Plan:

ADWF	Average dry weather flow
CBA	Critical Biodiversity Area
CCT	City of Cape Town (Employer)
DEA&DP	Department of Environmental Affairs and Development Planning
DMP	Dust Management Plan
ECO	Environmental Control Officer
EM	Environmental Manager
EMPr	Environmental Management Programme
EO	Environmental Officer
ER	Engineer's Representative
FBE	Fuel Burning Equipment
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NFEPA	National Freshwater Priority Area
NWA	National Water Act (No. 36 of 1998)
OESA	Other Ecological Support Areas
OHSA	Occupational Health and Safety Act (No. 85 of 1993)
PS	Primary sludge
RAS	Return Activated Sludge
SANS	South African National Standards
SoCC	Species of Conservation Concern
SST	Secondary Settling Tanks
TSE	Treated sewage effluent
WAS	Waste Activated Sludge
WUL	Water Use License
WWTW	Wastewater Treatment Works
DEA&DP	Department of Environmental Affairs and Development Planning
EM Specification	Environmental Management Specification

1 BACKGROUND INFORMATION & OVERVIEW

1.1 Introduction

The City of Cape Town (hereinafter referred to as CCT) intends to upgrade and expand the existing Macassar Wastewater Treatment Works (WWTW) in Macassar, Western Cape, to increase its capacity to provide essential wastewater treatment services to the surrounding community. Zutari (Pty) Ltd (Zutari) was appointed by CCT to undertake the task of designing the proposed upgrade and expansion, while the environmental assessment practitioners have provided environmental inputs and guidance where necessary.

In terms of Section 28 (1) of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) *“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 to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment”*. For this reason, every person who intends to undertake an activity which could potentially have a negative impact on the environment should take reasonable steps to implement mitigation measures to prevent such impacts during those activities.

The CCT aims to ensure that the proposed project will be undertaken in an environmentally responsible manner. This Environmental Management Programme (EMPr) is intended to ensure compliance with the principles of sound Environmental Management and the general “Duty of Care” specified in the NEMA, so as to avoid or minimise potential negative impacts on the natural environment during the construction phase.

The overall aim of this project includes the upgrade and capacity extension of the existing WWTW, which will include the refurbishment of selected infrastructure and an extension to the treatment capacity such that the ultimate design capacity is increased to 80 Ml/day (ADWF). The upgrade will remove capacity limitations on the existing process, reduce energy demand, optimise operation and maintenance and prevent further pollution of the Eerste River.

This EMPr is expected to be updated based on the outcomes of the Basic Assessment process anticipated to be completed in 2025.

1.2 Structure of this document

- This EMPr is intended for use by all the role players during all phases of the project and will form part of the contract documentation for all relevant contracts. There may be more than one team of Contractor’s operating on site either concurrently or consecutively, and this EMPr is relevant to any Contract and its appointed team.

This document is presented as four (4) sections:

- The first section provides an overview and background of the project, description of the site and proposed works, and purpose of the EMPr.
- The second section provides detail of the role-players within the contracting team.
- The third section sets out the environmental management and mitigation tables to be adhered to during the different lifecycle phases (i.e., pre-construction, construction and operations) of the upgrade and expansion of the WWTW.
- The fourth section sets out the environmental compliance related information including penalties, fines and auditing.

1.3 Background

The Macassar WWTW was originally constructed in 1977, which included the inlet works, carousel biological reactor and two secondary settling tanks, as well as the office and laboratory. The treatment capacity was expanded in 1988 which included the addition of the second carousel biological reactor and two additional secondary settling tanks. A further upgrade to the WWTW took place in 2002, which saw two additional secondary settling tanks and the dewatering facilities being added to the works. In early 2018, initial construction activities, in line with the Environmental Authorisation (dated 07 July 2016), was implemented by the CCT.

The Macassar WWTW receives flow from the Helderberg and Macassar Pump Stations and provides treatment of wastewater. The catchment areas currently served by the Macassar WWTW, include the areas of Somerset West, Strand, part of Gordons Bay, Helderberg and Macassar. In addition, there is the catchment that includes Blackheath and Eerste River and can contribute to the Macassar WWTW flows via the Black-Mac Outfall Sewer.

1.4 Site Description

1.4.1 Site locality

The Macassar WWTW is located between Khayelitsha and Strand, along the False Bay coastline. The site is bounded to the south by the sea and the Macassar beach complex lies to the Southwest. On the east, the site is bounded by the Eerste River, with industries beyond the river. There is no development to the west of the site, and it is open vegetated dune landscape. Refer to the locality plan in Figure 1 below. The nearest residential development is the Macassar township, a distance of some 0.6 km from the works and over the years has encroached towards the WWTW but not crossing the Macassar Road. The site is an existing live operational WWTW (a brownfield site), however, portions of the site within the cadastral boundary has not been developed. Construction of new infrastructure will occur in these undeveloped areas on the site and it will also occur in old sludge lagoon-type ponds which are no longer in use. To undertake construction in the lagoons, the sludge will be removed and safely disposed of. New infrastructure will also be constructed where some of the old infrastructure is no longer required and will be demolished.

The site is approximately 62 hectares in extent and the current treatment infrastructure comprises of an inlet works (screening and grit removal), two carousel ditch activated sludge reactors, six circular settling tanks, a chlorine disinfection facility (gas), maturation ponds, a sludge dewatering facility (linear screens and belt presses) and dewatered sludge silos. The WWTW primarily receives domestic wastewater and has a hydraulic capacity of approximately 48Ml/day in terms of average dry weather flow (ADWF). However, the biological process treatment capacity is estimated at approximately 21.6 Ml/day based on the existing aeration capacity. Treated effluent from the WWTW is discharged into the Eerste River and a small portion is also recycled for both off-site and on-site use, thus reducing the volume discharged into the Eerste River Estuary. For on-site use, treated effluent is required for irrigation and service water for the operation and cleaning of some of the mechanical equipment and process units (inlet works, dewatering building, general washing down). Treated effluent will pass through a filtration system and be pumped off site to downstream users via a treated effluent pump station.

Due to rapid urbanisation and a sustained population growth in the False Bay region, a shortfall in treatment capacity is experienced at the Macassar WWTW. The Macassar WWTW is also experiencing a number of operational challenges. Both of these factors have led to the Macassar WWTW not being able to treat wastewater adequately, this has resulted in a poor effluent quality being discharged into the Eerste River, which feeds into the receiving marine environment. These challenges have prompted the CCT to prioritise the upgrade and capacity extension of the Macassar WWTW.

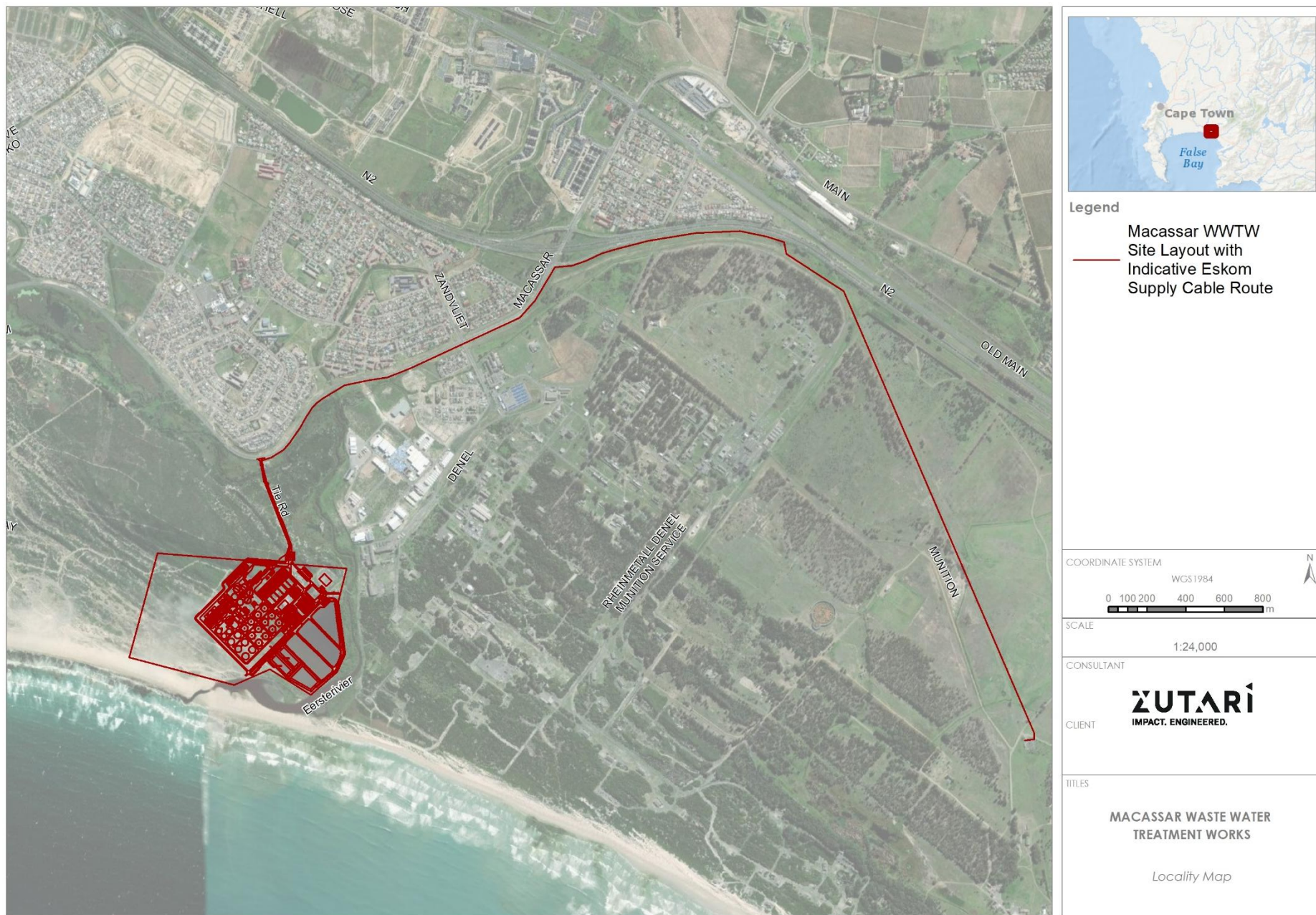


Figure 1: Locality Plan of Macassar WWTW

1.5 Description of relevant biophysical environment

The information below relating to vegetation, aquatic ecosystems and protected areas has been extracted from the Sharples Environmental Management Plan dated 2015. This section will therefore be updated with information from the relevant specialist reports upon completion of the Basic Assessment process.

1.5.1 Vegetation

The site falls within the original extent of the Cape Flats Dune Strandveld ecosystem (Munica & Rutherford 2006 & 2009). This ecosystem is regarded as Endangered in the National List of Threatened Ecosystems, 2011.

The site is located within a typical dune strandveld environment, with many characteristic strandveld species present. The vegetation to the west of the WWTW is mid-dense to closed shrubland with good quality strandveld present on the elevated dune areas, interspersed with disturbed areas that are either bare or covered with kikuyu grass or herbaceous weeds. Woody aliens, such as Rooikrans (*Acacia cyclops*), Manatoka (*Myoporum tenuifolium*) and *Acacia longifolia* are present on site but are scattered and not prominent. Most of the recorded strandveld species are common and widespread in the surrounding area.

The foredunes of the Macassar dune system lie to the south of the development site. The foredunes are the active dunes closest to the estuary/beach and are vegetated by low creeping pioneer species that are able to tolerate sand movement, wind and salt spray. The active foredunes, and the vegetation they support, are highly sensitive and susceptible to disturbance. A lower-dune area south-west of the development site acts as a buffer between the sensitive foredune areas and the development area. This buffer area must be retained to prevent construction activities from encroaching into the foredune area.

In terms of the Cape Town Biodiversity network, the WWTW and the disturbed areas associated with the historical WWTW ponds are classified as Other Ecological Support Areas (OESA), and are regarded as “Transformed sites of conservation importance”. This OESA is surrounded by a Critical Biodiversity Area (CBA), which supports endangered vegetation required to meet national vegetation conservation targets. A portion of the inlet works and proposed new access/ perimeter road will encroach on this CBA area.

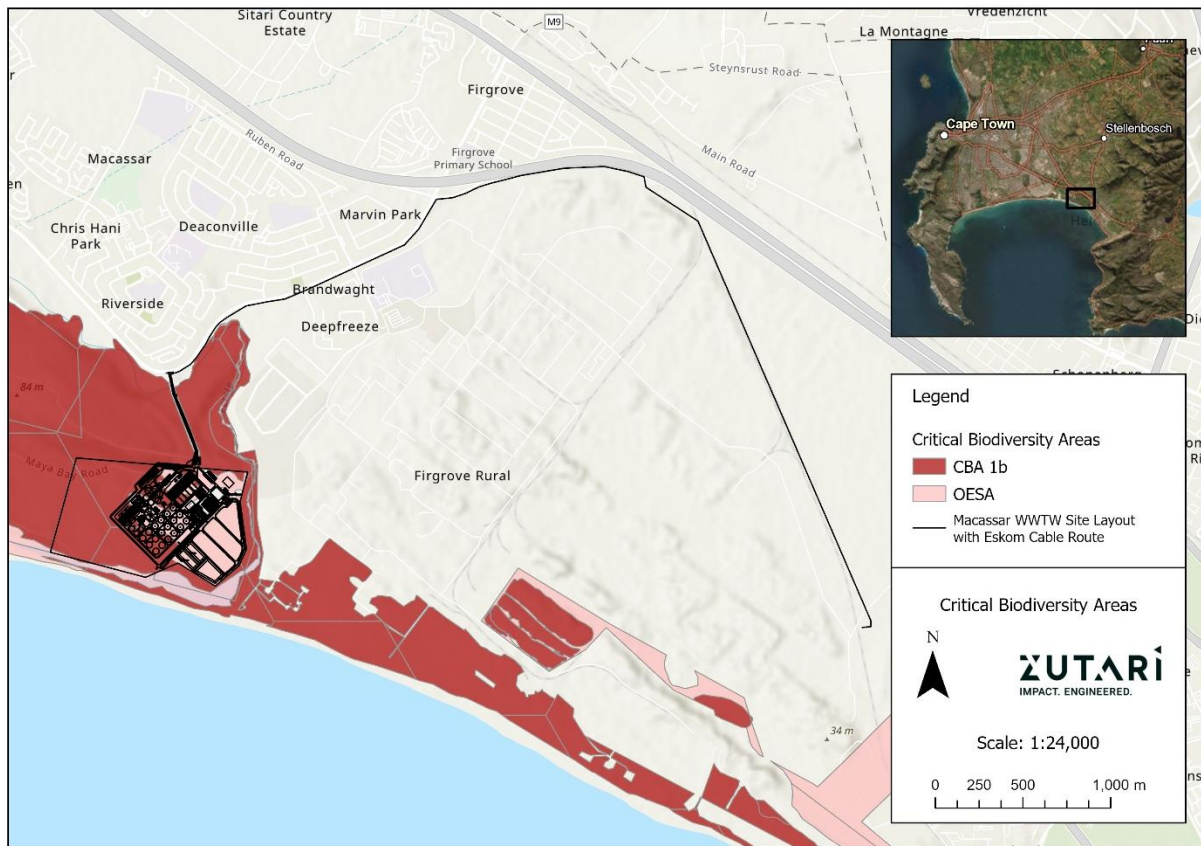


Figure 2: Location of Critical Biodiversity Areas at and surrounding the development site.

It is essential that adequate management of construction activities occur to limit the disturbance to the foredune area and protect natural endangered vegetation outside of the development area.

1.5.2 Aquatic Ecosystems

A large portion of the proposed new facilities will be located within disturbed areas associated with historical (disused) WWTW ponds to the west of the WWTW. These ponds are no longer in use and today function as artificial, seasonal wetlands/ waterbodies.

The wetland area to the south-west of the WWTW is inundated with water for large parts of the year, and supports tolerant wetland plant species. These artificial wetland areas are in a largely to severely modified ecological condition, provide limited goods and services, and are of a very low ecological importance and sensitivity.

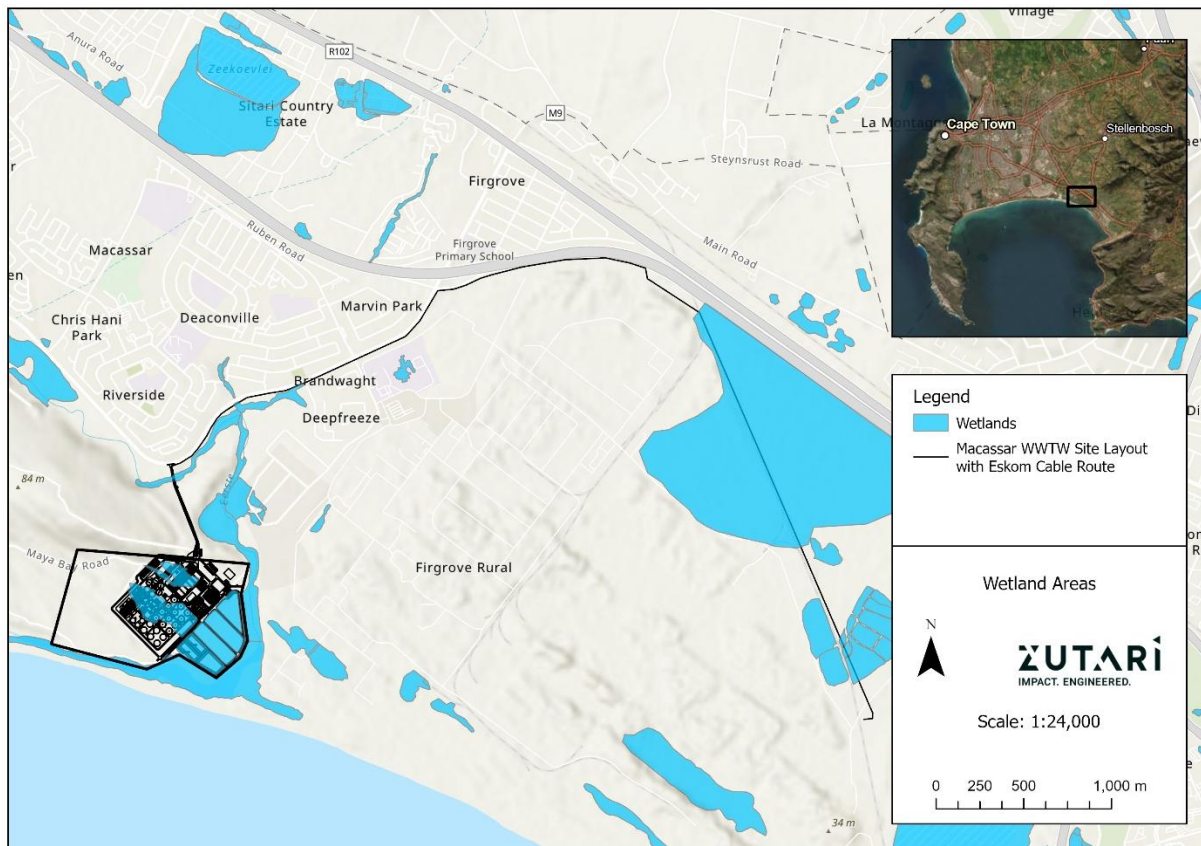


Figure 3: Location of proposed infrastructure in relation to wetland areas on site.

The Eerste River meanders $\pm 250 - 300\text{m}$ east of the development site and will not be directly physically impacted by the proposed development, with the exception of the installation of the new/upgraded outlet pipe which will extend into the bank of the river. The riparian zone of the lower Eerste River is in a disturbed state, having been invaded by alien plants and exotic grasses. The stretch of the Eerste River is in a severely modified ecological state, in terms of instream Maturation ponds habitat and riparian habitat. The lower Eerste River is considered to be of moderate Ecological Importance & Sensitivity, due to indigenous fish that occur within the river system and the link of the lower river with the estuary and Helderberg Marine Protected Area at the mouth of the estuary.

The Eerste River Estuary lies $70 - 200\text{m}$ south of the site. No new WWTW facilities are proposed within 100m of the estuary. Only the southern terminal of the proposed new access/ perimeter road may extend within $70-100\text{m}$ of the estuary. The estuary will not be directly impacted by the proposed development, but the additional discharge released into the Eerste River will flow into the estuary.

The Eerste River Estuary is a small estuary ($\pm 10\text{ ha}$ in extent) and is dominated by river flow. Increased water flow in the Eerste River (described above) has led to the “freshening” of the estuary, and the estuary mouth no longer closes periodically, as it would have under natural conditions. The mouth position has also changed and estuarine surface area has been drastically reduced over the last 60 years. Since the development of the WWTW (circa 1977), an extensive eastern lagoon opening to the east has dried up to be replaced by a smaller western lagoon opening to the west. This, coupled with the loss of adjacent wetlands, has led to at least a 75% reduction in habitat availability and diversity for aquatic biota.

The Eerste River estuary has been assessed as being in a Severely Modified ecological condition (Category E), primarily due to modifications in flow patterns, decreased water quality and decreased habitat availability. The estuary no longer serves as suitable habitat for estuarine fish species. The estuary does however provide important habitat (at a local level) for a diversity of bird species, and is reportedly home to $\pm 6\%$ of the South African coastal Avocet population.

The Eerste River and Estuary have been identified as National Freshwater Priority Area (NFPEA) wetlands.

The National Biodiversity Assessment for Estuaries (2011) indicated that the Eerste River Estuary should be given a high priority for rehabilitation due to the poor condition of the estuary, as well as the fact that the estuary occurs within a Marine Protected Area.

1.5.3 Protected areas

The Helderberg Marine Protected Area lies at the mouth of the Eerste River Estuary and extends eastwards along the False Bay coastline as illustrated in Figure 3. Discharge released into the Eerste River & Estuary will ultimately enter the Atlantic Ocean and may flow into the Helderberg MPA. Strict controls must therefore be in place to prevent the release of pollutants into the Eerste River & Estuary during both the construction and operational phases of the development.

The Macassar Dunes Conservation Area lies approximately 2.2km west of the development site. This conservation area covers an area of over 1000 ha, and more than 170 indigenous plant species as well as a wide range of birds and other small animals are known to occur in this area. The conservation area is managed by the CCT and has been identified as a potential provincial nature reserve. Erf 1205 has relatively good connectivity to the conservation area, via the undeveloped areas between the site and the conservation area. It is possible that floral and faunal species from the conservation area may be encountered at the development site or its immediate surrounds. It is thus of paramount importance to implement appropriate mitigation measures to avoid and minimise potential impacts to biodiversity.

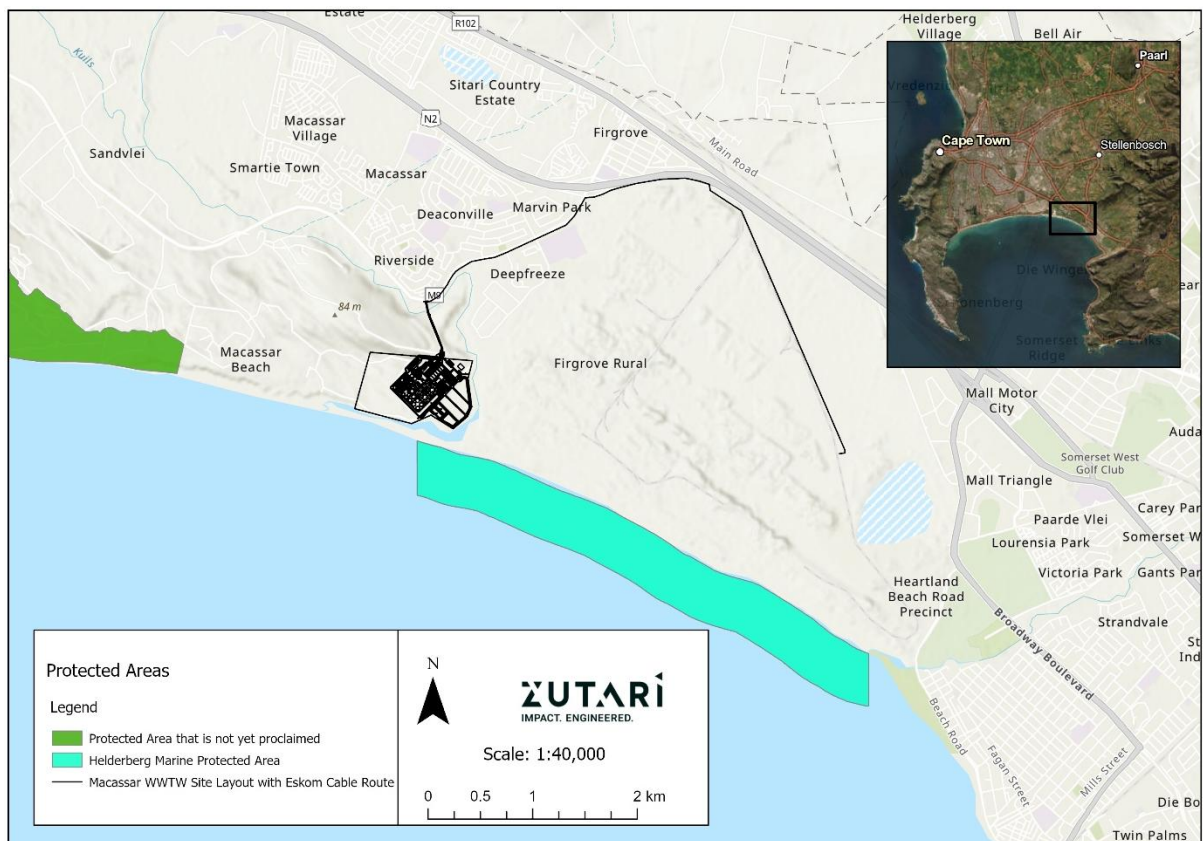


Figure 4: Location of the development site in relation to Protected Areas.

1.5.4 Fauna

Small mammals (e.g. dune moles and the Cape gerbil *Tatera afra*), amphibians, reptiles (including tortoises) and birds may occur on site and may be impacted by the proposed construction, particularly during land clearing, excavations and earth works.

Bird nesting sites may be found at the artificial wetland area, which is known to provide habitat for Egyptian Geese, Cape Weavers, Redknobbed Coots, Cape Teal and Egret. These nesting sites will be disturbed during infilling of this wetland area.

A small population of the threatened African Black Oyster Catcher (a red data species) is known to occur in the vicinity of the Estuary and along the False Bay seashore. Although these birds should not be directly physically impacted by the development, any deterioration in water quality and ecosystem health of the estuary may negatively impact on these birds, their food source and/or their habitat.

1.5.5 Cultural and historical resources

No resources of cultural or historical significance have been identified on site, or in the immediate surrounding environment. No cultural/ historical resources are expected to be impacted by the proposed development.

1.6 Proposed works

The current proposal is to refurbish or replace process units, facilities and amenities of the existing Macassar WWTW. The work is proposed to achieve improved treatment of the wastewater and improved operation of the works, for the liquid and sludge process streams. The current proposal will result in an additional operational capacity for the Macassar WWTW to 80Mℓ/d (average dry weather flow). Further to this, the work is proposed within the boundaries of the existing WWTW property. Refer to tender drawings 100780-0000-DRG-CC-0002/3 for the New Site Layout for the proposed works.

A comprehensive list of the scope of works can be found in C3.1.3 in Part C3: Scope of Works. The civil construction phase, as well as the mechanical and electrical phases of this project duration is specified within the Contract Data.

Additionally, the CCT proposes the following additional electrical infrastructure as part of the refurbishment of the Macassar WWTW, to supply power to site from the nearest Eskom substation:

- 2 x 11 kV MV Cables (with a distance of 300mm apart) and a length of 6,941 meters;
- Construction of the cables will require approximately, a trench depth of 1m and width of 1m with a buffer of 500mm offset either side of the proposed route;
- The route follows the previous Eskom overhead line / cable route and then follow the existing roads heading up to the works;
- Sections of the proposed route falls within a road servitude;
- A section of the proposed route crosses a floodplain wetland
- The river crossing at the Eerste River will either be via a road / pipe bridge crossing or drilling underneath the river.

1.7 Legal framework

1.7.1 National Environmental Management Act 107 of 1998 (NEMA)

On the 07 July 2016, the Department of Environmental Affairs and Development Planning issued an Environmental Authorisation (EA) to the City of Cape Town approving the proposed upgrade and expansion of the Macassar Wastewater Treatment Works (WWTW) and associated infrastructure on the basis that they were necessary to continue to provide essential wastewater treatment services to the surrounding community.

The main purpose of the new proposed project is to implement the aforementioned authorised upgrade of the WWTW, the construction of which has already commenced. However, due to the time that has

passed since the approval in 2016, new design engineers have been appointed to finalise the detailed design. The design engineers have identified alternative technology options that will enable the works to run more efficiently and improve the quality of the effluent being discharged to the estuary.

The proposed revised design upgrade constitutes the following listed activities in terms of the EIA Regulations, 2014 (as amended).

Table 1: Environmental Impact Assessment Regulations 2014 (as amended)

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1	Describe the portion of the proposed development to which the applicable listed activity relates.
19	<i>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i> <i>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i> <i>(a) will occur behind a development setback;</i> <i>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</i> <i>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</i> <i>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</i> <i>where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</i>	The development of the proposed 2 x 11 kV MV Cables (with a distance of 300mm apart) and a length of 6,941m will result in the infilling and depositing of material of more than 10 cubic metres at the river crossing of the Eerste River. The cables will cross the river via a road / pipe bridge crossing or drilling underneath the river will be done.
27	<i>“The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-</i> <i>(i) the undertaking of a linear activity; or</i> <i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan”.</i>	The development of the proposed upgrade facilities will result in the clearance of approximately 2.4ha of vegetation within an Endangered Ecosystem (Cape Flats Dune Strandveld) as identified in the 2011 National List of Threatened Ecosystems. Of the 2.5ha that will be cleared, ±0.2ha (2000m³) represents good quality natural strandveld.
Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3	Describe the portion of the proposed development to which the applicable listed activity relates.
12	<i>“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.</i> i. Western Cape <i>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;</i> <i>ii. Within critical biodiversity areas identified in bioregional plans;</i> <i>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;</i> <i>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</i> <i>v. On land designated for protection or conservation purposes in an Environmental</i>	The development of the proposed upgrade facilities and Eskom cables will result in the clearance of approximately 2.4ha of vegetation within an Endangered Ecosystem (Cape Flats Dune Strandveld) as identified in the 2011 National List of Threatened Ecosystems. Of the 2.5ha that will be cleared, ±0.2ha (2000m³) represents good quality natural strandveld.

	<i>Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister”.</i>	
Note: • <i>The listed activities specified above must reconcile with activities applied for in the application form. The onus is on the Applicant to ensure that all applicable listed activities are included in the application. If a specific listed activity is not included in an Environmental Authorisation, a new application for Environmental Authorisation will have to be submitted.</i> • <i>Where additional listed activities have been identified, that have not been included in the application form, and amended application form must be submitted to the competent authority.</i>		

1.7.2 National Water Act

Macassar WWTW is currently operated in terms of a water use licence (Licence No. 19/G22H/F/582), dated 21 July 2011, which allows for treated wastewater to be discharged into the Kuils / Eerste River. The City of Cape Town submitted an amendment to the Water Use Licence (WUL) to Ngobeni Tshembhani at DWS on the 24 Feb 2023. The current WUL application amendment covers the following:

- An increase to the amount of water to be released annually into the Eerste River, namely 80 Ml/day over 365 days; and
- Request for relaxation of the effluent criteria for phosphate (5 mg/l) and nitrate/nitrite (8 mg/l).

1.7.3 Other legislation

The Applicant is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on the Applicant's behalf, remain compliant with the conditions of the received EA and WUL, as well as the provisions of all other applicable legislation and guidelines.

The pertinent legislation, policies and guidelines that may be relevant to the management of environmental resources during the proposed development on site include, *inter alia*:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management: Waste Act (NEMWA) (Act 59 of 2008);
- NEMWA: Waste Classification and Management Regulations (GN No R 634 of August 2013).
- NEMWA: National Norms and Standards for the Assessment of Waste for Landfill Disposal (Gn No R 635 of August 2013).
- National Environmental Management: Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008)
- National Environmental Management: Air Quality Act (Act 39 of 2004) and the associated National Dust Control Regulations (GN No. R. 827 of 1 November 2013).
- Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983);
- National Water Act (Act No 36 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);
- Hazardous Substances Act (Act 15 of 1973)
- City of Cape Town Treated Effluent By-Law (2010)
- City of Cape Town Air Quality Management By-Law, PG 7662 of 17 August 2016
- Western Cape Provincial Coastal Management Programme (2022-2027).

- Western Cape Noise Control Regulations Provincial Notice 200/2013.

These sections of legislation have general applicability to most development applications, and it is the Applicant's 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.

1.8 Purpose of the EMPr

This report has been combined with the CCT's Environmental Management Specification which contains clauses that are generally applicable to the undertaking of construction works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. Site specific mitigation measures have also been included (where any further pertinent issues are not covered by the generic Environmental Management Specification) from the approved Environmental Management Programme (EMPr) compiled by Sharples Environmental Services (SES) which forms part of an Environmental Authorisation dated 7 August 2016 (EIA Ref no.: 16/3/1/1/A3/39/207814), as well as specialist reports as part of the Basic Assessment Process which is expected to be concluded in 2025. . This report therefore serves as an Environmental Management Plan (EMPr) to incorporate all applicable environmental input and management (mitigative) actions during all phases of the proposed expansion of the Macassar WWTW.

The contents of this EMPr must meet the requirements outlined in Section 24N (2) and (3) of NEMA. The general principles contained within the EMPr shall apply to all site activities. All activities shall observe any relevant environmental and other applicable legislation and in so doing shall be undertaken in such a manner as to minimise impacts on the natural and social environment.

The EMPr is intended for use by the Employer's Representative, the Contractor (s); and the Employer (CCT). Although care has been taken to address all known relevant environmental issues, the need may arise to add or amend certain procedures or instructions to improve the efficiency of the EMPr. This document should therefore be read as a dynamic report, subject to amendments.

The EMPr should be implemented from the start of the project and is binding on all consultants, contractors, sub-contractors, engineers, visitors and the Employer for the duration of the project.

2 CONTRACTING TEAM

2.1 Role-players

Several role-players are required to participate actively in the implementation of the EMPr with different roles and responsibilities assigned to each. This section sets out these roles and responsibilities.

2.1.1 The Employer

The Employer, City of Cape Town (CCT) shall:

- Assume overall responsibility for the administration and implementation of the EMPr through an appointed Project Manager or Engineer;
- Comply with all additional and relevant legislation in terms of permits and approvals required by the relevant authorities.
- All relevant permits and requirements are to be inserted into the EMPr upon receipt.

2.1.2 Engineer

Contracted by the CCT to design and specify the project engineering aspects. The Engineer runs the works contract and also fulfils the role of project manager on the Employer's behalf. The Project Manager has over-all responsibility for managing the project, contractors, and sub-consultants and for ensuring that the environmental management requirements are met. All decisions regarding environmental procedures must be approved by the Engineer and has the authority to stop any construction activity in contravention of the EMPr in accordance with an agreed warning procedure.

2.1.3 Engineer's Representative (ER)

The Engineer's representative on site. The Engineer's representative (ER) has the power/mandate to issue site instructions and in some instances, variation orders to the Contractor, following request by the Engineer or Environmental Control Officer (ECO). The ER oversees site works, liaison with Contractor and ECO.

2.1.4 Contractor

The principal contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMPr and conditions of the environmental authorisations, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMPr.

The Contractor is required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMPr will be implemented.

2.1.5 Environmental Manager (EM)

Appointed by the Engineer as their environmental representative. The EM must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site.

The EM must ensure that the registration and updating of the EMPr and all relevant documentation is carried out. The EM must also be responsible managing any environmental applications and/or permitting requirements during all phases of the project development.

The EM must ensure that the registration and updating of all relevant EMPr documentation is carried out.

The EM must be suitably experienced with the relevant qualifications and preferably competent in construction related methods and practices.

2.1.6 Environmental Control Officer (ECO)

An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of environmental authorisations, and the EMPr for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team.

The ECO must be proactive and have access to specialist expertise as and when required, these include botanist's, ecologists and other specialists as may be required. Further the ECO must also have access to expertise such as game capture (including snake catching).

The ECO must conduct audits on compliance to relevant environmental legislation, conditions of the Engineer, and the EMPr for the project. The size and sensitivity of the development, based on the EIA, will determine the frequency at which the ECO will be required to conduct audits. A minimum of a monthly site inspection must be undertaken. The ECO must attend site meetings and be responsible for providing reports and feedback on potential environmental problems associated with the development to the project team. The ECO must be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the developer and consulting engineers of any changes to environmental conditions as required by relevant authoritative bodies.

The EM must convey the contents of this EMPr to the Contractor's site team and discuss the contents in detail with the Contractor as well as undertake to conduct an environmental awareness training session prior to site handover to all contractors and their workforce.

The ECO has the authority to issue non-conformance and hazard certificates. Further, in terms of accepted industry practice the EM could issue the equivalent of a "cease works" instruction only in exceptional circumstances where serious environmental harm has been or is about to be caused i.e., in cases of extreme urgency and then only when the ER is absent. Furthermore, the EM shall not be held liable in instances where cease works, deemed later to be unjustified thereafter, were made in good faith.

The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible.

2.1.7 Environmental Officer (EO)

The EO is employed by the Contractor as his/her environmental representative to monitor, review and verify compliance with the EMPr (on a daily basis) by the Contractor. The EO must ensure that he/she is involved at all phases of the construction (from site clearance to rehabilitation).

The EO must report to the Engineer or ER, any environmental incidents, e.g., hazardous substances spillage, damage to vegetation, public complaints, and carry out instructions issued by the ER, required to fulfil his/her compliance with the EMPr.

3 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan has been amended following on from the comments received during the public participation process (insert dates). Changes include some additional environmental management / mitigation measures. Additionally distinct project phases have been added where specific environmental management / mitigation measures are applicable per phase. The project phases are as follows:

- Pre-Construction (Planning) Phase: This phase is prior to the contractor commencing with construction related activities which forms part of their scope of works under their respective contracts.
- Construction Phase: This phase covers the duration of construction and is mainly applicable to the Contractor (s).
- Operational Phase: This phase commences after construction has been completed. This phase is applicable to the Contractor responsible for the operation and maintenance beyond construction and the Employer who will ultimately be responsible for operation and maintenance.

Table 2: Environmental management / mitigation measures

Aspect	Management Actions
PRE-CONSTRUCTION (PLANNING) PHASE	
3.1. Protection of existing services	• The applicant must apply for the required wayleaves before construction commences. • The relocation or positions of new water and sewer reticulation must be discussed with the CCT's Regional Reticulation officials.
3.2. Waste management	• The contractor responsible for the waste generated must ensure compliance with the City's Integrated Waste Management Bylaw and must therefore be accredited to offer any services that relates to the transport and disposal of all waste.
3.3. Protection of flora and fauna	• Method Statements (MS) may be required as contemplated in Section 3.9. A MS for the works to take place along the periphery of the project site, i.e. adjacent to the Eerste River area and conservation area, must be submitted for review and approval to the Biodiversity Management and Environmental and Heritage Management Branches prior to these works commencing. This includes the placement of the power line, as well as the crossing of the Eerste River for which the final method of crossing has not yet been determined. • A botanical and faunal Search & Rescue must be conducted before any land-clearing or earth moving activities may commence.

	• Prior to land clearing, the Applicant must appoint a suitably qualified individual (botanist, terrestrial ecologist or other suitably qualified person) to undertake Search & Rescue and translocation of rescued flora to the offset area or stored at an appropriate nursery facility, and used to rehabilitate/revegetate disturbed areas post construction (See Section 3.44). • The ECO should visit and assess the site to determine if there is a need for faunal Search & Rescue. Should Search & Rescue be required the ECO and Contractor should develop an appropriate Method Statement for this. • Where necessary, the local conservation authority (e.g. Cape Nature or CCT's Biodiversity Management Branch can be contacted for guidance in relocating fauna, including the relocation of nests and young animals/ birds. • A permit from relevant authorities must be obtained prior to commencement of any construction activities for the disturbance of or removal of any nationally or provincially protected flora species such as: – Milkwoods (<i>Sideroxylon inerme</i>); – Any other identified through the Search and Rescue process.
3.4. Alien vegetation management	• An Alien Invasive Species Management Plan must be prepared by the Employer prior to construction commencing. Such a plan must include maps indicating where clearing is to be done, including all follow-up clearing, the methods to be used for clearing, as well as the frequency and timing of these activities.
3.5. Dust and odour management	• A site-specific Dust Management Plan (DMP) must be prepared and submitted to the CCT's Air Quality Management Unit as well as DEA&DP for approval prior to the commencement of construction, and implemented by the Employer in accordance with Section 26 (3) of the CCT's Air Quality Management By-Law, PG 7662 to include at least the following: – Identify all possible sources of dust within the affected site; – Detail the best practicable measures to be undertaken to mitigate dust emissions; – Detail an implementation schedule; – Identify the person responsible for implementation of the measures; – Incorporate a dust fall monitoring plan; and – Establish a register for recording all complaints received by the persons regarding dust fall, and for recording follow up actions and responses to the complaints. • An operational Odour Management Plan must be prepared by the Employer and submitted to the CCT's Air Quality Management Unit and DEA&DP for approval prior to the commencement of construction in terms of with Section 35 (2) of NEMA:AQA 39, 2004 as amended and shall be implemented to ensure that complaints are registered due to odour nuisances. • The Odour and Dust Management Plans must be circulated for comments to relevant Authorities (i.e., CCT Environmental Health and DEA&DP) and must be approved before commencement of the project.

3.6. Cultural/ Heritage resources	• Application to Heritage Western Cape (HWC) for a Workplan permit must be done before construction is initiated, since this would enable removal of any palaeo-material to be made with minimal delay.
3.7. General	• In terms of site demarcation, the working area and site camp must be clearly demarcated during the pre-construction phase and should be as per relevant drawings issues (i.e., new site layout, site establishment layout, no go areas). • In terms of the construction site camp and associated facilities the Contractor shall develop a site layout plan for the camp and laydown area identifying and demarcating the following facilities during the pre-construction (or construction phase) of the development: – Access route (if new access route is required - see Section 3.16 of this EMPr) – Site camp and site office – Laydown area – Ablution area – Eating area and rest area – Vehicle & equipment maintenance yard – Refueling area – Stockpile area (for stockpiling topsoil, cleared vegetation, spoil material etc.) – Waste storage area
CONSTRUCTION PHASE	
3.8. Record keeping	• Following official handover of the site to the Contractor and prior to the commencement of mobilization activities, the Contractor shall take photographs of all areas that will be impacted by the construction activity and their immediate surrounds. Photographs shall include, inter alia, all works areas, site establishment and laydown areas, access roads, gates, no-go and natural areas, debris, boundary fences, existing structures and infrastructure on the site and any defects or issues to any of the foregoing. These photographs shall be provided to the Engineer for reference purposes and shall be kept on site. • All records relating to the implementation of this EMPr should be kept on site during construction and shall be filed by the Contractor, Engineer and Employer for a minimum of five years after cessation of activities. These records must be available for the scrutiny by any relevant authority or delegated officials. • The Contractor shall keep a "Complaints Register" on Site. The Register shall contain all contact details of the person/s who made the complaint, and information regarding the complaint itself.
3.9. Method statements	• The ECO may require the Contractor to submit method statements for one or more construction-related activity, or any aspect of the management of the site, before the activity is undertaken or during the performance of the activity, if the activity is causing or may cause significant environmental damage or pose a health and safety risk.

	• Method Statements shall be produced and submitted for approval by the Contractor at least two weeks (except in the case of emergency activities) prior to the commencement of the activities. • Changes to a Method Statement may be required if the proposal does not comply with the EMPr specifications or if the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by the EMPr. • Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract. • Changes to the way the works are to be carried out must be reflected by amendments to the original approved Method Statements, and these amendments require the signature of both the Contractor and the Engineer. • Method Statements shall consider all environmental hazards and risks identified by the Contractor and/or the Engineer and shall contain sufficient information and detail to enable the Engineer to assess the potential negative environmental impacts associated with the proposed activity. • Method Statements for the following activities should be prepared and submitted for approval by the ECO before undertaking the activities concerned: – Construction procedures including timing and location of activities. – Site establishment, demarcation and no-go areas (including a site layout plan). – Environmental Awareness Training for all the Contractor's management staff, as well as other employees. – Search & Rescue of indigenous vegetation and faunal species. – For works adjacent to the Eerste River and Conservation area (during pre-construction and construction phases) – Clearing and grubbing. – Materials and equipment to be used, getting the materials and equipment to and from site and how the equipment/material will be moved while on site. – Infilling/ bulldozing of artificial waterbody/ wetland to the west of the WWTW. – Cement/ concrete batching, disposal and emergency contingencies. – Topsoil and sub-soil storage / stockpiling. – Storage of fuels and hazardous chemicals and emergency contingencies. – Asphalt and Bitumen: details of all methods and logistics associated with the use of bitumen and asphalt. – The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur. – Waste management system. – Storm water management and control. – Fire Control & Fire Emergency Plan. – Emergency preparedness plan / emergency response procedure (see Section 3.39 and Section 3.40).
--	---

	– Post-construction rehabilitation. – Any other information deemed necessary by the Engineer. – The format to be used for the required method statements is provided in Appendix A of this EMPr. The Contractor (and, where relevant, any sub-contractors) must also sign the Method Statement, thereby indicating that the work will be carried out according to the methodology contained in the approved Method Statement. • The ECO has the authority to request additional method statements, and 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.
3.10. Environmental Awareness Training	• It is a requirement that environmental awareness training courses (undertaken by the ECO) are run for all personnel (including all sub-contractors) before commencing any work on site. • Courses shall be run during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participants' names on completion, a copy of which shall be handed to the Engineer. • Subsequent sessions shall be run for any new personnel coming onto site. A Method Statement with respect to the organization of these courses shall be submitted. • During this training, the ECO will explain the EMPr and the conditions contained therein. Attention will be given to the construction process and how the EMPr fits into this process. • Two types of courses shall be run: one for the Contractor's and sub-contractors' management; and one for all site staff and labourers (not later than 3 working days after the commencement of work on Site). • All the Contractor's employees, sub-contractors' employees and any suppliers' employees that are required to work on site shall attend the Environmental Awareness Training Course. • Other items relating to sound environmental management which should be discussed and explained during the environmental awareness training sessions include: – The demarcated "No-Go" areas; – General do's and don'ts of the site; – Making of fires; – Waste management, use of waste receptacles and littering; – Use of the toilets provided; – Use and control of building materials and equipment etc.; – Control, maintenance and refueling 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, as regards the protection of environmental resources.

	Environmental awareness training and education should be ongoing throughout the construction phase and should be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMP), or as new workers come to site. Translators should be utilised where needed.
3.11. Construction personnel information posters	- The Contractor shall erect and maintain information posters for the information of his employees, depicting actions to be taken to ensure compliance with aspects of the EMP. A2 information posters, printed on white vinyl, shall be erected at the eating areas and any other locations specified by the Engineer. - The specification for the poster is presented in Appendix B of this EMP. The symbols shall be black, and the circles shall be red lines. The Contractor shall ensure that the construction personnel information posters are not damaged in any way and shall replace a poster if any part of it becomes illegible.
3.12. Site demarcation	- The Contractor shall restrict all his activities, materials, plant and personnel to within the site or any particular working areas specified or indicated on the drawings. - The area to be cleared of vegetation (i.e., the working area, site camp and other site facilities) and all no-go areas must be clearly demarcated with some form of fencing before undertaking any land clearing activities. - The Contractor shall erect and maintain permanent and/or temporary fences of the type and in the locations specified in the Scope of Work or on the drawings if so specified and be erected before undertaking any construction activities. - Temporary fences may consist of orange barrier netting, bonnox fencing, shade netting, droppers & wire/ danger tape, or similar – as feasible and practical. - The working area and site camp must be clearly demarcated during the pre-construction phase. - The demarcation boundary should be tight around the footprint of the proposed facilities, typically allowing a working area of no more than 3-5m around the building/ facility footprint (unless otherwise agreed with the ECO) to prevent construction activities from extending into undeveloped areas surrounding the development site. - Fencing around the working area must be maintained and not moved during construction, to prevent construction activities and disturbance from spreading into surrounding undeveloped areas unless agreed otherwise with the ECO. - A Method Statement detailing the layout and method of establishment of the Contractor's camp (including all offices, shelters, eating areas, storage areas, ablution facilities and other infrastructure required for the running of the project) shall be provided. - The authorised overall development boundary should be surveyed and pegged out and fenced on site prior to any site development. - Any boundary fencing used must be permeable to small animals at ground level, with regular gaps of 200mm wide and 150mm high. This is not applicable to the Main Security Fencing surrounding the build area of the WWTW as the Main Security Fencing needs to be secure to prevent theft and vandalism. Additionally, with continuous large vehicle

	movement, various open tanks and structures which contain wastewater or sludge, and mechanical and electrical equipment, which is live and operational, it needs to be ensured that animals do not enter the plant due to their safety and wellbeing.
3.13. No-Go areas	• Prior to the commencement of any land-clearing or construction activities, sensitive areas which must not be disturbed during development must be demarcated as “no-go” areas. The development footprint must avoid the highly sensitive areas with their respective buffer zones. • Where environmentally sensitive areas are specified as “no go” areas, the Contractor shall ensure that, insofar as he has the authority, no person, plant or material shall enter the “no go” areas at any time. • All undeveloped areas outside of the demarcated working area, site camp and site facilities must also be regarded as No-Go areas. • The foredune area, the estuary, all undeveloped vegetation surrounding the working area, and any other sensitive areas identified by the ECO must be regarded as no-go areas. • No-go areas should be demarcated using a $\pm 1.2\text{m}$ high fence constructed of either orange barrier netting, shade netting, red construction hazard tape or 2-strand wire fence wrapped with danger tape and staked at regular intervals of between three and five meters. The wire, one along the top of the fence and one along the bottom should be sufficient to keep the fence rigid. Where a fence is considered impractical “No-Go” signs should be erected at regular intervals in consultation with the ECO. The Contractor is to ensure that the fence is well maintained throughout the duration of construction. • No-go areas must be protected from disturbance and are 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. • No areas of natural or partly natural vegetation should be disturbed outside the pegged/fenced out and authorised site. • No vehicular activity or dumping of material may take place outside the authorised site. • Due to the loss of indigenous vegetation (approximately 7ha of High sensitivity habitat and approximately 2ha of Medium sensitivity habitat) and the impact to aquatic features due to the expansion of the WWTW, an offset receiving area of 176ha has been calculated. One of the offset options is located adjacent to the current development site and if chosen, will be included in the Macassar East Nature Reserve. This area shall then be identified as a no-go area and all mitigation measures relating to no-go areas will be applicable to this offset area. Refer Appendix H.1.1 and Appendix H.1.2 for the No-go areas maps.

3.14. Land clearing

- Land-clearing activities shall only be undertaken in areas strictly required for the proposed development, and to prevent unnecessary disturbance of vegetation and dunes outside of the development footprint.
- No vegetation may be cleared from within the no-go areas.
- Land clearing activities should not take place during heavy rains, or windy conditions.
- Only the area required to accommodate construction activities currently occurring within the working area should be cleared of vegetation. All other areas not undergoing construction at that the same time, shall not be cleared. Unnecessary clearing/ disturbance of land and exposure of soil must be avoided.
- Land clearing and construction activities must be restricted to within the demarcated working area to prevent unnecessary disturbance, exposure or compacting of surrounding areas.
- During land clearing, small trees and large shrubs should first be cleared by hand (brush cut), which will help to flush fauna from the site before mechanical land clearing commences.
- Where vegetation must be cleared, mature trees and shrubs should be brush-cut and stockpiled for use as mulch/ erosion control during site rehabilitation.
- The translocation of Species of Conservation Concern (SoCC) from the development site into the offset receiving area should be conducted (should this be deemed feasible) by the CCT Biodiversity Management Branch (the offset implementing agent) based on the suitability of the translocation environment and competition considerations.
- Search and rescue of Cape Dwarf Chameleons (*Bradypodion pumilum*) and all other translocatable fauna should take place on site prior to any site disturbance, as well as during site establishment (site clearing). This should be undertaken by authorised and experienced faunal experts.
- Search and Rescue of all usable plant material should be undertaken on site prior to any site disturbance, as well as during site establishment (site clearing). Neither of the two plant Species of Conservation Concern (SoCC) namely *Capnophyllum africanum* and *Asparagus lignosus* recorded can be easily translocated, although this should be attempted. This should be undertaken by authorised and experienced biodiversity, botanical, terrestrial flora experts..
- Stabilisation of any cut sand dunes and slopes outside the approved development site should be undertaken using only the rescued plant material from site and should be undertaken by the appointed botanical Search and Rescue botanist, ecologist or other suitably qualified person.
- Where areas have been cleared, sand trapping methods should be implemented to minimise the movement of sand to nearby offsite roads, residential areas, other properties, developments and land uses. Sand trapping methods could include:
 - Fencing the work area using screen mesh material;
 - Covering exposed surfaces with screen material;

	– Implementing wind rows using cleared plant material from site; – Planting of indigenous vegetation (in accordance with Section 3.44); – Other methods recommended by the Contractor upon approval from the Engineer and ECO. • Any trenches or excavations created during construction should be examined for trapped animals twice a day, and these should be removed and released in a suitable natural habitat. Land clearing specifically related to geotechnical investigations • Trampling and cutting of vegetation – Where access to a site to undertake exploratory drilling is required to traverse indigenous vegetation, all attempts to avoid the clearance of vegetation must be made. – Herbaceous vegetation (plants that have no persistent woody stems) may be pruned or cut to within 10cm above ground level directly in the path identified for access. The remaining vegetation may be flattened / trampled by the vehicles which must remain within the tracks made by any prior movement. No unnecessary additional tracks may be made other than required for vehicles and personnel to move in single file, one at a time. – Vegetation cut in such a manner must be left on the ground in the path from which it was cut. The soil surface is not to be disturbed during this operation and no vegetation or dead surface organic matter may be disturbed. – Any protected plant species (identified through Search and Rescue) must not be cut but rather those individuals, if any, should be avoided when planning the access routes. – Should fauna be encountered during vegetation cutting, works shall cease until fauna have been safely relocated. • Vegetation clearance – Vegetation clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible. The detail of vegetation clearing shall be to the Employer's approval. – The Contractor shall strip the topsoil within the working areas. Topsoil and subsoil should be managed in accordance to the requirements contained in Section 3.17 below. – The disposal of vegetation by burying or burning is prohibited without the requisite permit from the local authority. – Should fauna be encountered during site clearance, earthworks shall cease until fauna have been safely relocated.
3.15. Construction Site Camp & Associated Facilities	• The area/s for the site camp and associated facilities should be selected in consultation with the Engineer and ECO. • The site camp, material stockpile area, laydown area and site facilities should be located within the already transformed footprint of the existing WWTW or within the footprint of the new facilities. • No construction camps, temporary or permanent laydown areas or any activities associated with the development are to be located within the important conservation areas. • Only areas with low environmental growing vegetation and topsoil (which will contain seeds) may be cleared via bulldozer.

	• The total area of the intended site camp and associated site camp facilities (laydown area, ablution area, temporary waste storage area, refuelling area etc.) should be stripped of all topsoil (as may be present) before any of the Contractor's infrastructure or machinery is stored within the site camp. Topsoil that is removed should be dealt with as indicated in Section 3.17 of this EMP. • The site camp and associated areas should be adequately fenced off along the boundaries of these areas, preferably with 2m high fence and shade netting or Bonnox fencing or similar. • The Contractor shall develop a site layout plan for the camp and laydown area as contemplated in Section 3.7. • The area chosen for the site camp and associated site facilities (listed above) must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. • Site facilities should be located as far away as possible from the Eerste River, Estuary, coastal zone, no-go areas and any areas of natural vegetation. • The location should also be convenient for ease of access and should not interfere with the ongoing operation and maintenance of the existing WWTW.
3.16. Site access and haul roads	• The Contractor shall control the movement of all vehicles and construction equipment, including that of his suppliers, so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic, and that all relevant laws are complied with. • Existing access and haul roads must be utilized as far as possible. Movement of construction workers, vehicles & machinery must be restricted to existing access roads and the demarcated working area. No vehicles may be driven through natural vegetation outside of the working area. In addition, the movement of such vehicles and construction equipment shall be planned and operated so as to minimise disruption to regular users of the routes. • The existing access point off Macassar Road should be utilised to access the construction site and site camp. This access road to the site is located on Macassar Road, which is a busy road that carries a moderate to high volume of foot-traffic and vehicle-traffic. Appropriate traffic management strategies must be implemented to ensure the safety of construction vehicles and other road-users. This is particularly relevant where construction vehicles must turn across oncoming traffic on Macassar Road in order to enter and exit the site. If needed, signage to warn other road users of the presence of construction vehicles should be erected at appropriate locations, where the signage will be clearly visible to potentially affected road users. • Damage to existing access roads as a result of construction activities shall be repaired to the satisfaction of the Engineer, using material similar to that originally used. The cost of the repairs shall be borne by the Contractor. • No new or temporary access or haul roads may be established, except those new roads indicated on the site layout plan and as authorised by the Engineer. The rehabilitation of such routes shall be to the Contractor's own cost and to the approval of the Engineer.

	• The most degraded/ disturbed area should be selected for any such temporary road, and the road must be rehabilitated to the satisfaction of the ECO after use. The route to be used for a temporary access road must be subject to botanical Search & Rescue beforehand. • The Employer and Contractor must ensure that the necessary authorisations have been obtained before creating any new temporary access roads. • Any directional signage required by the Contractor for the purposes of directing the movement of his own vehicles and construction equipment (or that of his sub-contractors or suppliers) must be of a design and in a location approved by the Engineer. Directional signage may not be erected in such a manner that it interferes with sight lines or pedestrian movement. • The movement of construction related vehicles and machinery should not interfere with the ongoing operation of the WWTW. The access road (off Macassar Road) that will be used to access the construction site is the same access road used to access the existing WWTW. Staff members and numerous other vehicles that service the existing WWTW enter and exit the site on a daily basis, via the existing access road. • There is an existing gravel road running around the outside of the western boundary of the WWTW. This perimeter road allows road users to drive around the WWTW when travelling to/from the coastline. These users include recreational users (fisherman, birders, beach goers). Due the expansion of the works, the perimeter road will be re-routed around the footprint of the new development, in order to retain the existing access to the coastline. The re-routing of this perimeter road must be prioritized by the contractor and done in such a way as to present as little impact to other road users as possible. It is recommended that the rerouting of this road be done with the construction of the new perimeter fencing before commencing construction of the new infrastructure of the WWTW. This is to ensure that other road users may safely travel around the site without needing to pass through an active construction area. Other road users must at all times have access to an established road in order to travel to/from the coastline. • At no time may access to the coastline be completely cut-off as this may force other road users to travel off-road through undeveloped vegetation in order to travel around the WWTW and development area.
3.17. Topsoil and subsoil management	• Topsoil (i.e. the top 10-15cm) should be stripped from any area where physical disturbance of the surface will occur, including within the footprint of the development site (working area) and within the site camp, ablution area, vehicle maintenance yard, refueling area and temporary waste storage area. Topsoil removal and stockpiling should be undertaken only after consultation with the ECO. Stripped topsoil should be utilised to rehabilitate the site after construction. • The removed topsoil must be stockpiled in a berm, in a demarcated area as agreed with the ECO. • The topsoil storage area must be located on a level area outside of any surface drainage/ storm-water channels, and at a location where it can be protected from disturbance during construction and where it will not interfere with construction activities. Stripped topsoil shall not be dumped on natural vegetation outside of the working area.

	• Stockpiles of topsoil must not be higher than 2m and shall be domed at the top to promote runoff. • The topsoil stored in the berm must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth, “anchovy nets” or other suitable measures should be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles should not be covered with tarpaulin, as this may smother and decrease the viability of topsoil. • Handling of topsoil should be minimised as much as possible. Ideally topsoil should only be handled twice: once to strip and stockpile, and once to replace, level and scarify. Location of topsoil stockpiles should be carefully selected so as to avoid the need to relocate the stockpile at a later date. • Stockpiles of earth material may not be located within any storm-water drainage pathways and must be outside of the reach of potential flood waters. • Where possible, soil stockpiles should be kept clear of woody alien vegetation growth. • 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. • Removed subsoil must be stockpiled separately from topsoil. • Where possible, stripped topsoil should be transferred immediately to rehabilitated areas, rather than being stockpiled. Topsoil should not be compacted. • Removed topsoil and subsoil should be stockpiled for the duration of the active construction period, and utilised for the final landscaping and rehabilitation of disturbed areas on site, around the completed facilities. • Note that the topsoil should be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.
3.18. Soil erosion, stormwater runoff and sedimentation	• The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall, in addition, comply with such detailed measures as may be required by the Scope of Work. • The storm water management system developed by a qualified engineer and approved by the CCT, must be implemented on site and must be properly maintained. • Land clearing, earth moving and construction activities should not take place during heavy rains, or windy conditions. • Construction should proceed quickly and efficiently to minimise the amount of time that exposed surfaces are without a suitable cover. • Cleared areas and any other area susceptible to erosion should be proactively managed by the Contractor. These areas shall be provided with a suitable cover and stabilised as soon as possible via the implementation of appropriate erosion control measures. The method of stabilisation shall be determined in consultation with the Engineer and 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 should be selected by the Contractor in consultation with the ECO. • Stockpiles of earth material may 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 or sedimentation on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures carried out in accordance with details specified by the Engineer. • Where erosion and/or sedimentation, whether on or off the Site, occurs, rectification shall be carried out in accordance with details specified by the Engineer. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the Engineer, at the Contractor's cost. In particular, the Contractor shall ensure that the CCT's stormwater system is kept free from sediment arising from the Works. • Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition. • The scale and nature of the erosion and storm water control measures implemented on site should be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, storm water control) to the satisfaction of the ECO and Engineer. – Small-scale control measures: This may include the use of shade netting, geo-fabric or similar permeable barriers in areas susceptible to erosion and along exposed slopes. The netting/fabric is placed directly across the path of flow of storm water. Poles, logs, or net/hessian tubes filled with coarse plant material/wood chips may be staked in along the contours of a slope susceptible to erosion may also be used. – Medium-scale control measures: This may entail the establishment of small berms and benches cut into affected slopes, as well as the placement of poles, logs or net/hessian tubes filled with coarse plant material/wood chips, may be staked in along the contours of the slope. Berms can be created to divert storm water run-off into surrounding vegetated areas, rather than flowing directly onto exposed work area. – Large-scale control measures: This may entail the establishment of temporary (or permanent) retention pond and large berms. • The following general storm water and erosion control measures are applicable, regardless of the scale of the control measures required on site: – Effective storm water management should be achieved via an integrated system, and not a collection of ad hoc interventions. – Existing storm water infrastructure at the site should be used as far as possible. – The diversion of established flow routes should be avoided where ever possible. – Stripped areas should not remain uncovered for extended periods of time.
--	--

	• Stockpiles of topsoil and subsoil must be protected from erosion as specified in Section 3.17. • Rehabilitation of erosion channels should be ongoing during the construction phase and not left until the end of the construction period. • After each construction phase is completed, the Contractor must ensure that all disturbed surfaces are provided with suitable cover and/or rehabilitated as described in Section 3.44 of this EMPr. Hardened surfaces (including within the working area and site camp) should be ripped and mulched to improve filtration & reduce run-off.
3.19. Vegetation management	• The Contractor to check that a botanical Search & Rescue has been conducted before any land-clearing or earth moving activities may commence. • Vegetation within the footprint of the development area will need to be cleared and the site levelled before construction of the proposed new WWTW facilities can commence. • No vehicles may be driven through natural vegetation outside of the working area. • The following measures must be adhered to when clearing the site: – The area to be cleared of vegetation (i.e. the working area, and possibly the area/s for the site camp and site facilities) and all no-go areas must be clearly demarcated as specified in Section 3.13, before undertaking any land clearing activities, unless otherwise agreed with the ECO. – The ECO must be notified prior to commencing with land clearing activities, regardless of whether the vegetation to be cleared is alien or indigenous. – All land-clearing activities must be restricted to within the demarcated working area. NO clearing of vegetation may occur outside of the demarcated footprint and NO vegetation may be cleared from within the no-go areas. – It is recommended that mature trees/ bushes on site should first be removed by hand (i.e. brush cut). If the alien seed content of the removed trees/bushes is high the plant material should be disposed of at a licenced Waste Disposal Facility, or given to the local community for use as firewood. If the seed content of the removed trees is low, then the removed plant matter should be chipped and used for mulch during rehabilitation of disturbed areas on site, or used as mulch elsewhere in the municipality, or taken to a municipal compost heap. The ECO should be consulted for guidance in this regard. – Low growing vegetation and topsoil ($\pm$ top 10-15 cm) may be cleared via bulldozer. The removed vegetation and topsoil should be stockpiled on site, in a demarcated area, and used as topdressing during the rehabilitation of disturbed areas on site. – Plants “rescued” during botanical Search & Rescue must be translocated to the offset area or stored at an appropriate nursery facility, and used to rehabilitate/revegetate disturbed areas post construction (See Section 3.44).

	• The control of any weeds and invader plants needs to be done under professional supervision to avoid bare areas that are potentially subject to wind erosion from sprouting weeds. The use of locally indigenous species for revegetating disturbed areas is advocated. • The planned construction at the WWTW is an opportunity to remove invasive aliens (within the construction footprint) currently used on the terrain, replacing <i>Myoporum serratum</i>, for instance, with <i>Pterocelastrus tricuspidatus</i> (kershout) and <i>Sideroxylon inerme</i> (milkwood) trees. • Sediments accumulated in stilling ponds should be utilized so that the ponds remain viable and do not fill up. • An Alien Vegetation Management Plan is required (as contemplated in Section 3.4), which includes the control of herbaceous weeds, and the development of cover of indigenous species in any dysfunctional sediment ponds.
3.20. Watercourse management	• The narrowest disturbance corridor ($\pm 3\text{m}$) required to install the outlet pipe must be clearly demarcated/ fenced as described in Section 3.12. • Excavation and earthmoving activities, and the movement of construction machinery and workers should be restricted to within the demarcated disturbance corridor. • Construction vehicles/ machinery may not enter the stream bed of the Eerste River. An applicable buffer must be determined in collaboration with the ECO and applicable ecologist / specialist. • The Contractor shall take reasonable measures to prevent the contamination of water on or around the project site. The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, rivers, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes. No abstraction of water from any natural water resource shall take place for site activities without an authorisation from the Department of Water and Sanitation. • Electrical conduits and pipeline manhole cover levels shall be above the 1:100 flood levels and fitted with water-tight covers and frames thereby ensuring floodwater is kept out. In the absence of 1:100 year flood level information for the site area, manhole covers shall be installed proud of the ground level, at a height ranging between 250 mm and 500 mm from the natural ground level, with water-tight covers and frames as recommended. • Infilling of the artificial wetland: – The new infrastructure will be constructed within the artificial waterbodies (disused sludge ponds) to the west and south of the WWTW. This artificial waterbody will need to be infilled and levelled at the required elevation as part of the development. – The infilling of the wetland area should take place at a time when the water level in the waterbody is low (i.e. during late spring, summer or early autumn). The concentration of aquatic biota (e.g. macroinvertebrates) and nesting birds is likely to be lower during drier conditions, and the potential impacts to faunal species will thus be lower than if infilling takes place when water levels are high.

	– If it is necessary to pump water out of the waterbody before infilling, the water may be released into the surrounding dunes and vegetation, provided that the water is released in such a way that will allow the water to disperse and infiltrate into the surrounding land without creating erosion channels or gulleys. It must also be ensured that the water is not significantly contaminated before releasing it into the environment ("significant contamination" = presence of contaminants in concentrations that may pose a risk to biota or human health). The discharge must be determined in collaboration with the ECO and applicable ecologist / specialist. – Faunal and botanical Search & Rescue (if required) should be undertaken prior to infilling of the historical WWTW pond.
3.21. Materials handling, use and storage	• The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the EMPr. The Contractor shall ensure that these delivery drivers are supervised during offloading by someone with an adequate understanding of the requirements of the EMPr. • Materials shall be appropriately secured to ensure safe passage between destinations. Loads, including but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. • All manufactured and or imported materials shall, where reasonably possible, be stored within the Contractor's camp and, if so required by the Engineer, out of the rain. The location and method of protection of such materials stored outside of the Contractor's camp and the method of rehabilitation of these areas, shall be subject to the Engineer's approval. • Stockpile areas shall be approved by the Engineer before any stockpiling commences.
3.22. Ablution and toilet facilities	• The Contractor shall provide ablution facilities for all personnel employed on the Site, including shelter, toilets and washing facilities. The Contractor's personnel will not be permitted to use the CCT's ablution facilities. • Washing, whether of the person or of personal effects, defecating and urinating are strictly prohibited other than at the facilities provided. • Toilet facilities provided by the Contractor shall occur in a ratio of not less than 1 toilet per 15 workers for each gender. Toilet paper shall be provided at all times. • Toilet facilities shall be located within the Contractor's camp on a level surface, but also at work areas remote from the camp, all to the satisfaction of the Engineer. The Contractor shall ensure that the entrances to toilets are adequately screened from view. • Toilets should not be located in or near (within 50m of) any water body and should be outside of any storm water drainage lines/ canals. • All portable/chemical toilets shall be adequately secured to the ground to prevent them toppling over as a result of wind or any other cause.

	• Toilets shall be maintained in a hygienic state, serviced regularly and the waste disposed of at a licenced WWTWs. Care must be taken to prevent spillages when moving or servicing chemical toilets. • Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. • A Method Statement shall be provided by the Contractor detailing the provision, location, and maintenance of ablution facilities. • The ECO would need to regularly inspect the state of all portable/chemical toilets.
3.23. Eating areas	• The Contractor shall designate eating areas within the approved Contractor's camp within which construction workers can rest and eat during breaks. • Seating and shade should be provided where workers are protected from the weather. • The feeding of, or leaving of food for, animals is strictly prohibited. Sufficient bins, as specified in Section 3.25, shall be present in these areas. • No open fires (including braai's) are permitted. Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present.
3.24. Site structures and equipment maintenance	• Prior to the construction and installation of a steam boiler, an application for Fuel Burning Equipment (FBE) must be submitted via the CCT's e-Services portal for authorisation in terms of Section 11 and 12 of the CCT's Air Quality Management By-Law, PG 7662, 2026, for approval. • The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce the visual impact. • The Contractor shall ensure that any lighting installed on the Site for his activities does not cause a reasonably avoidable disturbance to other users of the surrounding area. • Lighting installed shall, as far as practically possible, be energy efficient. Lighting utilised on Site shall be turned off when not in use. • Repairs to vehicles/ machinery may take place on site, but only within a designated maintenance yard area (except when emergency repairs are required elsewhere). The vehicle maintenance yard should be located on already disturbed areas at the existing WWTW, or other location agreed with the ECO, and away from environmentally sensitive areas. All maintenance activities in this yard must take place on an impermeable surface such as drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs. • All vehicles and plant shall be kept in good working order. Leaking vehicles and plant shall be repaired immediately or removed from the Site.

	• The Contractor shall ensure that in those areas where the Contractor carries out emergency or minor routine plant maintenance, there is no contamination of the soil, water sources or vegetation. • The washing of vehicles and plant on Site shall be restricted to emergency or minor routine maintenance requirements only. Washing may only be undertaken in areas designated by the Engineer.
3.25. Waste management	• The waste generated on site must be efficiently managed in accordance with the waste hierarchy and disposal must be seen as the last option. • The site shall be kept neat and clean at all times, littering is prohibited. • No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur. • The Contractor shall provide sufficient scavenger and weatherproof bins with lids, of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times. • Waste (including litter, building waste, oily rags, etc.) shall be separated and sorted in the appropriate bins: hazardous waste, general waste and recyclable material. Bins shall be labelled accordingly. • General and hazardous waste streams must under no circumstance be mixed. Should this occur, the entire volume of waste will be classified as hazardous. • The Contractor must ensure that all workers on site are familiar with the correct waste disposal procedures to be followed. • Bins shall not be allowed to become overfull and shall be emptied regularly, at least once a week. • Waste from bins may be temporarily stored on site in a central waste area that is weatherproof and scavenger-proof, and which the Engineer has approved. • Wherever possible refuse shall be recycled, and containers for glass, paper, metals and plastics shall be provided and the contents delivered to suitable recycling facilities when necessary. • All other litter and refuse shall be disposed of off-site at an appropriate licensed Waste Disposal Facility. The Contractor shall supply the Employer's Agent with a certificate of disposal. • Where possible all construction waste or spoil material shall be recycled, either on site or elsewhere. • Sludge from the existing sludge lagoons will be tested to confirm the sludge classification (in terms of microbiological class, stability class and pollutant class) which will inform the beneficial management options available. The following is to be considered in terms of sludge disposal: – As the current Macassar WWTW receives primarily domestic wastewater (with a small percentage from commercial businesses) and does not produce primary sludge, it is anticipated that the sludge classification will yield a result indicating the sludge is suitable for land use application or disposal at general landfill sites. If sludge yields a result

	as contemplated in the bullet above, then the sludge will need to be disposed of via vendors (currently contracted with the City of Cape Town and have a track record in sludge disposal) who deal in land use application. – If the sludge classification yields results indicating the sludge is not suitable for land application or disposal at a general landfill site, then the contractor will need to dispose of the sludge at a licensed waste disposal facility, in this instance the contractor shall supply the Employer's Agent with a certificate of disposal.
3.26. Hazardous substances	• Materials, fuels and other chemicals and hazardous substances required during construction must be stored according to the manufacturer's product-storage requirements, and must include a covered, waterproof bunded housing structure. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases. • Method Statements covering the procedures for detailing how these liquids will be stored, handled and disposed of and dealing with accidental hydrocarbon spillage and leaks of hazardous substances and batching of cement must be submitted to the ECO for approval before undertaking such activities. • Hazardous substances should be stored on bunded, impermeable surfaces with sufficient capacity to hold at least 110% of the capacity of the storage tanks. • The Engineer shall approve the location of all fuel storage areas. All necessary approvals with respect to fuel storage and dispensing shall be obtained from the appropriate authorities. • Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" conforming to the requirement of SANS 1186 are to be prominently displayed in and around the fuel storage area. There shall be adequate fire-fighting equipment at the fuel storage area. • The Contractor shall ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and adequately secured. The capacity of the tank shall be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SANS 0232 part 1. Where feasible, fuel tanks should be elevated so that leaks are easily detected. • Fuel storage tanks shall have a capacity not exceeding 9000 litres and shall be kept on site only for as long as fuel is needed for construction activities, on completion of which they shall be removed. • The tanks shall be situated on a smooth impermeable base with an earth bund. The volume inside the bund shall be 110% of the total capacity of the total volume stored within the bund. The base may be constructed of concrete, or of plastic sheeting with impermeable joints, covered by a layer of compacted earth to protect the sheeting. The impermeable lining shall extend to the crest of the bund. The floor of the storage area shall be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed easily.

	• Refueling of vehicles/ machinery should take place at the site camp or vehicle maintenance yard. Where refueling must occur using a mobile bowser, drip trays should be utilized under the dispensing area. The dispensing mechanism for the fuel storage tanks shall be stored in a waterproof container when not in use. • If any rainwater collects in the bunded areas, it shall be dealt with in accordance to Section 3.29 and taken off Site to licensed Waste Disposal Facility approved by the Engineer. • Only empty and externally clean tanks may be stored on the bare ground. Empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected. • The Contractor shall ensure that there is always a supply of absorbent material (e.g. Spill Sorb or Enretech #1 powder or equivalent) readily available that is designed to absorb, break down and encapsulate minor hydrocarbon spillage. The quantity of such material shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill. • Treatment and remediation of hydrocarbon spill and leak areas shall be undertaken to the satisfaction of the Engineer. In the event of a hydrocarbon spill the source of the spillage shall be isolated and the spillage contained. • Any asbestos removal, handling and disposal will be carried out by a certified and approved asbestos contractor. Mitigation measures for such requirements will be subject to a separate method statement. • Response plans for highly toxic and reactive gasses as contemplated in Section 3.39.
3.27. Protection of fauna and flora	• Except to the extent necessary for the carrying out of the works, as specified by the Engineer, no vegetation shall be removed, damaged or disturbed. • Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement to the Engineer and ECO for approval. • For details on faunal and flora Search & Rescue please see Section 3.3. • Where necessary, the local conservation authority (e.g. Cape Nature or CCT's Environmental Resource Management Department) can be contacted for guidance in relocating fauna, including the relocation of nests and young animals/ birds. • The movement of construction workers, vehicles and machinery should be restricted to the demarcated construction/ work area to avoid disturbance to fauna in the surrounding area. Vehicles and machinery may not drive through surrounding undeveloped vegetation or dunes. • Prevent further loss and fragmentation of vegetation communities and high biodiversity areas in the vicinity of the study area.

	• Where Search & Rescue is not required, one or more workers should walk ahead of vehicles/ machinery during land clearing, to flush out mobile fauna, and to identify any slow-moving fauna (snakes, tortoises, young animals) that should be provided with opportunity to passively vacate the area, or which should be relocated. • Workers involved with land clearing and earthmoving must be cognisant that dune moles may be encountered on site (up to a depth of 1-2 meters below surface) during earthmoving and may be scooped up with earth material during bulldozing and excavating. Moles (and other fauna) so encountered should be provided with opportunity to vacate the area. • The presence of any wild animals found on site shall be reported to the Engineer, who shall issue an instruction with regard to their removal or relocation. • Fauna should be allowed to passively vacate the area. Active relocation of fauna should be a last resort and should only be performed by a person skilled/ experienced enough to do so without endangering him/herself or the animal/bird. • If a wild animal needs removal from the site, the CCT's Biodiversity Management Branch or CapeNature (Metro Region) Conservation Services Manager (021 955 9132/ 9121/3122/9130) may be contacted for assistance. • Feeding, trapping, poisoning, injuring, hunting or shooting animals is strictly forbidden. • No domestic pets or livestock are permitted on site, with the exception of controlled watchdogs approved by the Engineer. • Infilling of the historical WWTW pond (artificial waterbody) should ideally take place during the dry summer months, when the water level in the water body is low (likely to be lower concentration of water birds, nesting birds, amphibians, macro- & micro-invertebrates etc.). Where necessary, dead fish should be bagged and disposed of at a licensed Waste Disposal Facility. • The proposed installation of the powerline within the western extent within the disturbed road reserve and attaching the cable to the bridge crossing the Eerste River is supported. • Open trenching for the cable would be acceptable provided the works is undertaken during the low rainfall period (November to April) and the duration of the construction works is limited as far as possible. • Before the construction activities, suitable indigenous wetland plants within the proposed trenching and construction areas could be identified and set aside for revegetating the disturbed areas immediately after construction is complete. • The soil and cover vegetation removed to excavate the trench in which the cable is to be laid should be replaced over the line at the same level as the existing level. • Use of machinery in the wetland areas should be limited as far as possible. Use of an excavator on tracks that can be driven along the excavated trench, excavating and backfilling as the pipeline is laid is recommended. The minimum area for the construction and lying of the cable in the eastern extent of the route should be demarcated and the wetland areas
--	---

	outside of the construction areas treated as no-go areas. Any areas significantly compacted by machinery will need to be ripped and revegetated following construction. • All rubble associated with construction activities should be removed after the construction phase is complete. • Control of invasive alien vegetation within the disturbed areas will need to continue for the duration as which is stipulated in the Alien Vegetation Management Plan.
3.28. Alien vegetation management	• Alien vegetation management is required and shall be done in accordance with the plan developed as contemplated in Section 3.4. This must include the control of herbaceous weeds, and the development of cover of indigenous species in any dysfunctional sediment ponds. • Disturbed areas on site must be monitored, and regularly cleared of unwanted alien vegetation. • It is essential that the clearing of invasive alien plants and in particular Port Jackson willows be undertaken during and after construction activities. • Alien vegetation should be cleared using best practice methods. Manual and mechanical methods should be favoured over chemical methods. • Where alien vegetation clearing occurs, mature alien trees/ bushes on site should first be removed by hand (i.e. brush cut). If the seed content of the removed trees is high the plant material should be disposed of at a landfill site, or burnt at an appropriate facility, or given to the local community for use/ re-sale as firewood. If the seed content of the removed trees is low, then the removed plant matter should be chipped and used for mulch during rehabilitation of disturbed areas on site, or used as mulch elsewhere in the municipality, or taken to a municipal compost heap. The ECO should be consulted for guidance in this regard. • Where possible, soil stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
3.29. Pollution/ Contamination of soil and water resources	• The Eerste River, estuary and lagoon are considered no-go areas however, if work is required in these areas, activities should be minimised as far as possible. • Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any spill or escape can be contained and the water table and/or any adjacent water courses or bodies are not endangered. • Any grey / dirty stormwater to be drained or fed back to the inlet works. • Vehicles and machinery must be in good working order and must be regularly inspected for leaks. • If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate location for repair. The ECO has the authority to request that any vehicle or piece of equipment that is contaminating the environment be removed from the site until it has been satisfactorily repaired.

	• Repairs to vehicles/ machinery may take place on site, but only within a designated maintenance yard area (except when emergency repairs are required elsewhere). The vehicle maintenance yard should be located on already disturbed areas at the existing WWTW, or other location agreed with the ECO. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs. • Drip trays must also be utilised during decanting of hazardous substances & when refilling chemical/fuel storage tanks. • Drip trays must be placed under generators (if used on site), water pumps and any other machinery on site that utilises fuel/ lubricant. • Spill kits which can be used to contain and/or mop up spills shall be available on site. • Water containing such pollutants as cements, concrete, lime, chemicals, oils and fuels shall be discharged into a conservancy tank for removal from the site to a licensed Waste Disposal Facility. This particularly applies to water emanating from concrete batching plants and to runoff from fuel storage, refueling or construction equipment washing areas. • Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. • No paint products, chemical additives and cleaners, such as thinners and turpentine, may be disposed of into the stormwater system or elsewhere on Site. Brush/roller wash facilities shall be established to the satisfaction of the Employer's Agent. • A Method Statement shall be provided by the Contractor for procedures to be followed in event of hazardous spills and the management of contaminated water must be submitted to the ECO for approval before undertaking such activities. • Method Statements for the storage of hazardous substances, batching of cement, and procedures to be followed in event of hazardous spills must be submitted to the ECO for approval before undertaking such activities. The Contractor is responsible for compiling the Method Statements (see Section 3.9). • Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste at a licensed Waste Disposal Facility. • Should contaminated water be released into the environment, specifically into a water course, monitoring thereof shall commence in accordance with the National Water Act, 36 of 1998, Section 21(f) – refer to GN 399 (26 March 2004). Contaminated water must not be released into the environment without authorisation from the relevant authority. • The Contractor shall notify the Engineer immediately of any significant pollution incidents on Site and, at his own cost, take all reasonable measures to contain and minimise the effects of the pollution. • Any significant event resulting in the spill or leak of hydrocarbons (e.g. petrol, diesel or oil) or any other hazardous solvents into the ground and/or watercourses must be reported to all relevant authorities, including the Directorate: Pollution and Chemicals Management, within 14 (fourteen) days. This requirement is in terms of section 30 (10) of the
--	--

	NEMA, that pertains to the control of emergency incidents and should include the reporting, containment and clean-up procedure of such incident and the remediation of the affected area. All necessary documentation must be completed and submitted within the prescribed timeframes. Containment, clean-up and remediation must commence immediately in the case of NEMA section 30 incidents. - Any rehabilitation of the environment required as a result of such pollution shall be carried out by the Contractor at his own cost in accordance with a Method Statement approved by the Engineer. - A site register (incident register) should be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the Engineer. Actions taken to remedy the incidents should also be recorded. - The use of the treated wastewater during the drier summer months should be encouraged to reduce the volumes that need to be discharged to the estuary, particularly during the low flow period when seawater intrusion and tidal exchange within the estuary may have naturally occurred.
3.30. Cement and Concrete Management	- Cement batching must take place on an impermeable surface large enough to retain any slurry or cement water run-off. - If necessary, bidim lined detention ponds (or similar) should be constructed to catch the run-off from batching areas. Once the water content of the cement water/ slurry has evaporated or filtered into the ground, the dried cement should be scraped out of the detention pond and disposed of at a licensed Waste Disposal Facility authorised to deal with such waste. - Cement batching should take place on already transformed areas at the existing WWTW, or at another location of low environmental sensitivity as agreed with the Engineer and ECO. - Where hand mixing or a mobile mixer is required outside of the batching area, mixing shall be undertaken on an impermeable surface such as mortar board and/or plastic liner. Cement shall not be mixed on the bare ground. - Cement bags shall be stored on pallets on an impermeable surface such as a plastic liner and covered at all times to protect it from the weather (i.e. rain and wind). - Where cement spills have occurred onto the bare ground, it shall be cleaned immediately, taken to a lined area where it can harden and then removed to the appropriate waste bin / storage area. - Unused cement bags must be stored in such a way that they will be protected from rain and wind. Empty cement bags must not be left lying on the ground and must be disposed of in the hazardous waste bin. - Washing of excess cement/concrete into the ground is not allowed. A wash bay may be established for this purpose however, it must be lined with an impermeable surface such as a plastic liner. Once the water content of the cement water/ slurry has evaporated, the hardened cement should be scraped out of the wash bay and stored at the designated builder's rubble stockpile, thereafter, disposed of at a licensed Waste Disposal Facility authorised to deal with such waste. The plastic liner shall be replaced regularly to ensure there is no leakage onto the bare ground.

	• All excess concrete/ cement must be allowed to harden, temporarily stored at the designated builder's rubble stockpile and thereafter, removed from site and disposed of at a licensed Waste Disposal Facility. • A Method Statement for the batching of cement, and procedures to be followed in event of cement spills must be submitted to the ECO for approval before undertaking such activities.
3.31. Asphalt and bitumen	• Bitumen drums/products, if stored on Site, shall be stored in an area approved by the Engineer. This area shall be indicated on the Method Statement for the Site Layout and Preparation of the Contractor's Camp. The storage area shall be constructed with an appropriate base, bunding and sump to the satisfaction of the Engineer. A Method Statement shall be provided in this regard. • When heating bitumen products, the Contractor shall take cognisance of appropriate fire risk controls. Heating shall only be undertaken using LPG or similar zero emission fuels. • Appropriate firefighting equipment shall be readily available on Site.
3.32. Traffic & road safety impacts	• All construction vehicles must adhere to traffic laws when travelling to and from the site. • All drivers and machinery operators must be aware that they are working in an area with a potentially high volume of foot and vehicle traffic (particularly in the vicinity of Macassar Town), and must exercise due caution when entering/ exiting the site. • The movement of construction vehicles and machinery must not interfere with the day-to-day operations of the existing WWTW or endanger or obstruct persons/vehicles working at or visiting the WWTW. • The Contractor must ensure that existing traffic flow is accommodated, so as to cause as little disruption/ congestion as possible. • Appropriate signage should be erected to warn other road users about the presence of construction vehicles, particularly at the point where construction vehicles enter/ exit the access point on Macassar Road. • If needed, appropriate traffic management measures and/ or points men (traffic marshals) should be utilised to assist vehicles entering/ exiting the site, particularly where vehicles must cross the path of oncoming traffic. • 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 should be scheduled for outside of peak traffic times. • The Contractor must consider public access to the coastline as contemplated in Section 3.16.
3.33. Noise generation	• The Contractor shall limit noise levels. Noise-levels must comply with the relevant health and safety regulations (as applicable) and the provisions of SANS 1200A Clause 4.1 regarding "built-up areas". Noise should be monitored by the HSO, as appropriate. • Noise-generating construction activities should be restricted to normal construction working hours between 07h30 and 18h00 Monday's to Friday's. Should the Contractor need to do this work outside of the above times, he shall do so only with the approval of the Engineer, and the surrounding communities shall be informed prior to the work taking place. • Appropriate directional and intensity settings are to be maintained on all hooters and sirens and if deemed necessary, machinery and equipment should be fitted with mufflers/ exhaust silencers unless in emergency situations. • Loud music is not allowed on site. The use of audio equipment shall not be permitted, unless the volume is kept sufficiently low so as to be unobtrusive. • Vehicles, machinery and other equipment must be kept in good working order. • Construction work should proceed efficiently, in a planned and well-managed manner so as to limit the duration of the disturbance.
3.34. Cultural/ Heritage resources	• The Contractor shall take cognisance of the provisions of the National Heritage Resources Act, 25 of 1999 in respect of, inter alia, structures older than 60 years; archaeology, palaeontology and meteorites; burial grounds and graves; and public monuments and memorials. • Heritage resources may include human remains, gravestones, stone tools, artefacts, old coins and pottery, fossil shell middens, rock art and engravings, remains of old built structures, etc. • An archaeologist and/or palaeontologist must be contracted to monitor the grubbing (with a focus on the WWTW site and Paardevlei precinct). • Should any heritage resources be encountered all works in that area must stop immediately, the finding should be protected from further disturbance (ideally left in situ) and the Chance Finds Procedure (refer to Appendix D) shall be implemented. Reporting chance finds as early as possible to the ECO and HWC or an archaeologist /palaeontologist (who may require an inspection if not present on site at the time). • A Workplan should be in place so that collection of artefacts can commence immediately, as and if required. • A decision will need to be taken during the monitoring process as to whether enough material is present to warrant retention of a collection, as well as the analysis, curation and reporting of the finds.

	• The finding should be handled and/or removed from site as per instructions issued by the Heritage Authority or delegated heritage specialist. • At minimum a photographic record and description of the material and its context should be captured. • Disturbance of the dunes outside the project footprint must be minimised. • Any fossil material encountered during the course of construction is property of the state and must be retained. The relevant heritage specialists will remove, transport and place in an approved institution such as the Quaternary collection of Iziko South African Museum. • Palaeontological awareness training can be presented by a heritage professional and is a useful way to stimulate worker interest and facilitate their recognition and reporting of fossil material if encountered. This could be in the form of examples of what the fossils might look like and explaining why they are important elements of our heritage.
3.35. Protection of natural features	• The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes, unless agreed beforehand with the Engineer. • Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Engineer. The cost of restoration /rehabilitation shall be borne by the Contractor. • The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.
3.36. Aesthetics	• The Contractor shall take any requisite measures to ensure that construction activities do not have an undue negative impact on the aesthetics of the area. • Only the minimum area required to accommodate construction activities (i.e. the demarcated work area, site camp and other site facilities) should be cleared of vegetation ahead of each construction phase. • The site camp must be kept neat and tidy and free of litter at all times. • The site camp, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site should be located in such a way that they will present as little visual impact on surrounding residents and road users as possible. • Use of lighting (if required) should take into account surrounding residents and land users and should present little or no nuisance. Downward facing, spill-off type lighting is recommended. • The site camp may require visual screening via shade cloth or other suitable material. Special attention should be given to the screening of highly reflective material.
3.37. Dust and odour management	• The Contractor shall take all reasonable measures to minimise the generation of dust.

	• Construction must comply with Section 4, 25, 26 and 19 of the CCT's Air Quality Management By-Law, PG 7662 of 17 August 2016 (as amended), which addresses the duty of care (reasonable measures to prevent air pollution), prohibition of emissions that cause nuisances, dust emissions and the authorisation of open burning and burning of material, respectively. • The Contractor shall be solely responsible, at his cost, for the control of dust arising from his activities on Site, and for any costs involved in damages resulting from the dust. • Wind conditions be considered prior to the commencement of daily construction activities, and for activities that could lead to excessive dust to be suspended during periods of high wind speeds. Land clearing and earthmoving activities should not be undertaken during strong winds, where possible. • Cleared areas should be provided with a suitable cover as soon as possible, and not left exposed for extended periods of time. • Appropriate dust suppression measures must be applied as and when necessary. Such measures may include the use of water trucks and/ water bowzers to damp down dust-generating surfaces. • Non-potable water at a suitable water quality for irrigation shall be used for dust suppression wherever possible. • 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 should not be covered with tarpaulin as this may kill the seedbank). • The location of stockpiles must take into account the prevailing wind direction and should be situated so as to have the least possible dust impact to surrounding residents, road-users and other land-users. • Material loads should be properly covered during transportation. • Construction vehicles must comply with appropriate speed restrictions on the site and on the unsurfaced access road. • The CCT's Air Quality Officer (AQO) reserves the right to call for the implementation of dust fallout monitoring during all phases of construction of the project, in the event that it becomes evident that the dust nuisances are not effectively managed. The Dustfall Monitoring Programme may include the submission of monthly or quarterly dust fall reports. The Dustfall monitoring reports, where required, must prove compliance with the prescribed dust fall rates as follows:
--	---

	<table><tr><th>Restriction Areas</th><th>Dustfall rate (D) (mg/m²/day, 30-days average)</th><th>Permitted frequency of exceeding dust fall rate</th></tr><tr><td>Residential area</td><td>D < 600</td><td>Two within a year, not sequential months.</td></tr><tr><td>Non-residential area</td><td>600 < D < 1200</td><td>Two within a year, not sequential months.</td></tr></table>	Restriction Areas	Dustfall rate (D) (mg/m ² /day, 30-days average)	Permitted frequency of exceeding dust fall rate	Residential area	D < 600	Two within a year, not sequential months.	Non-residential area	600 < D < 1200	Two within a year, not sequential months.
Restriction Areas	Dustfall rate (D) (mg/m ² /day, 30-days average)	Permitted frequency of exceeding dust fall rate								
Residential area	D < 600	Two within a year, not sequential months.								
Non-residential area	600 < D < 1200	Two within a year, not sequential months.								
3.38. Fire control	• No open fires are permitted on site. Any open fires which occur shall be reported to the Engineer immediately. • Smoking may only be undertaken in designated areas. • Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include fuel storage and refueling areas, and any other areas where the vegetation or other materials are susceptible to the start and rapid spread of fire. • In terms of the National Environment Management: Air Quality Act, 39 of 2004 and Community Fire Safety By-law, burning is not permitted as a disposal method. • Hot works that may generate sparks should be properly contained or avoided during strong windy conditions to prevent wind-blown sparks that may cause fires at other locations. A fire extinguisher should be present wherever any hot works are occurring. • A fire extinguisher rated for handling electrical fires must be present during the jointing / connecting of electrical cables. • The Contractor shall appoint a Fire Officer (who may be the EO) who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall forward the name of the Fire Officer to the Engineer for his approval. • Construction workers should be given basic fire-prevention and fire-fighting awareness training and must be made aware of the procedure to follow in the event of an accidental fire. • The Contractor shall ensure that there is suitable and sufficient fire-fighting equipment (in good working order) available on Site at all times. • In the event of an unplanned fire, the Contractor must notify the local fire-fighting department as soon as possible and should not wait until the fire can no longer be controlled before notifying the authorities. • Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.									

	• The Contractor shall be liable for any costs relating to the rehabilitation of burnt areas, should the fire be the result of the Contractor's activities on Site. • The Contractor shall submit a Method Statement to the Engineer covering the procedure to be followed in the event of a fire.
3.39. Emergency response procedures	• The potential environmental risks that may arise as a result of the construction and operation 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, release of toxic and reactive gases, etc. • The 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. • An emergency response plan specific to potential leaks of chlorine gas shall be developed that has alarms with appropriate level of redundancies built in. Such a plan should be developed in the event of an emergency release and in consultation with the CCT's Disaster Management, Fire and Life Safety Units. • The ECO, together with the Contractor, the Employer and HSO are responsible for ensuring that all employees are aware of the emergency procedures and are properly trained 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 Contractor's attention is drawn to the Method Statements required in terms of Section 3.9 above. Such Method Statements shall include procedures to be followed by the Contractor in the event of an emergency. • Furthermore, in the event of an emergency the Contractor shall contact the CCT's Emergency Call Centre by telephoning 107 or 021 480 7700 (from a cell phone). Telephone numbers of emergency services, including the local firefighting service, shall be posted conspicuously in the Contractor's office near the telephone.
3.40. Emergency preparedness	• The following measures should be implemented, as appropriate, to ensure effective responses to emergencies: – All workers on site must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures should be held at least annually. – All workers should ideally be given basic fire-awareness training and be advised on basic fire-fighting and safety techniques. – Fire-fighting equipment must be available on site.

	– All workers must be trained on how to respond in the event of a spill of a hazardous substance (sewage, fuel, chemicals etc). – A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) should be available on site at all times. – Any major incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO should then (depending on the nature of the spill) notify the relevant authorities, if needed. – A first aid kit must be available on site at all times. – Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated. These numbers should also be saved to the cellphones of relevant parties. – 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 should be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.
3.41. Temporary site closure	• In the event of temporary site closure (for a period exceeding one week), the Contractor's EO shall carry out checks and ensure that, amongst others, the following conditions pertain and report on compliance with this clause: – Fire extinguishers are serviced and accessible. – There is adequate ventilation in enclosed spaces. – All hazardous substance stores are securely locked. – Fencing and barriers are in place. – Emergency and management contact details are prominently displayed and available. – Wind and dust mitigation measures, e.g. straw, brush packs, irrigation, etc. are in place. – Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows. – There are sufficient detention ponds or channels in place. – Cement and materials stores are secured. – Toilets are empty and secured. – Central waste area and all refuse bins are empty and secured. – Contaminated water conservancy tank empty. – Any bunded areas are clean and treated with an approved product where applicable (e.g. Spill Sorb or Enretech #1 powder or equivalent). – Drip trays are empty and secure. – Excavations or depressions are drained of any pooled water. – All trenches, excavations and manholes are secured.
3.42. Contractor's advertising signage	• Any advertising on the Site or any part of the Works shall remain at the sole discretion of the Employer, who reserves the right to order, via the Engineer, its removal, covering or re-sizing, wherever placed, at no cost to the Employer.

	• Apart from at the Contractor's camp, no signage advertising the Contractor, or any of its sub-contractors, manufacturers, suppliers or service providers shall be placed, fixed or erected anywhere on the Site or on the Works without the prior approval of the Engineer. No advertising signage will be permitted on any designated scenic route. Notwithstanding any prior approval given, the Engineer may instruct the Contractor to remove, cover or re-size any advertising signage at any time at no cost to the Employer. • Advertising signage at the Contractor's camp shall be appropriately designed and sized with due consideration to the surrounding environment, views and sight lines. • Branding or identification markings on the Contractor's and sub-contractor's vehicles and equipment is generally permitted, although the Employer reserves the right to instruct, via the Engineer, the removal, covering or re-sizing of any branding, markings or signage, on any equipment (scaffolding, for example), which it considers inappropriate in the environment in which it is placed. • No third-party advertising (that is, in respect of any person, business or product that is not associated with the Works) shall be permitted anywhere on the Site or Works.
3.43. Installation of Pipelines and Conduits for Electrical Cables	• A wayleave process will be followed where the Engineer and/or Contractor shall consider existing services. • The Contractors is required to use competent sub-contractors with proven track records to undertake the work in accordance with specifications and this EMPr. • Work that is carried out on any electrical substations, will be planned appropriately with the necessary wayleaves in place to reduce any outage time and the relevant CCT branch will communicate details of these upgrades to businesses, residents and other users timeously • Trenches must be excavated within the predefined and demarcated working widths as per the approved corridors and construction design drawings. • The trenches will be excavated to the specified depth and the excavated materials will be stockpiled at designated stockpile areas or along the work areas. The excavated subsoil material must not be mixed with the topsoil material, which must be managed as per Section 3.17, above. • Preference is given to the reuse of clean on-site material for bedding material. However, bedding material may be imported from commercial sources if on-site material is not available, and the commercial source is approved by the Engineer. • Open excavations and trenches must be demarcated, and checked at regular intervals to ensure no fauna has fallen into them (also see Section 3.27 above). • For areas which are congested with services (as guided by the wayleave process and available as-builts), hand excavation shall be considered to ensure mitigation of damage to underground services.

	• Plastic warning tape must be installed in trenches with power lines during the backfilling of the trenches to warn those undertaking future excavations of the presence of the power supply. • Active dewatering (i.e., pumping) of ground or surface water from excavations will be undertaken as required. Where required, sandbags may be packed within trenches and/or excavations to dam any subsurface or surface water entering the trench and/or excavation. A dewatering pump may then be placed in the trench or excavation and the water pumped via a lay flat into the most appropriate location, which could include a nearby stormwater drain (if consent from local authority received), dam, or vegetation etc., as approved by the Engineer and/or Environmental Manager. No water may be pumped into any watercourses. Alternatively, water from dewatering may also be pumped into a water truck, which can then use the water for dust suppression on the access roads or discharged at a nearby WWTWs, if so approved. If the above is not feasible, alternative dewatering methods and sites shall be discussed with the Engineer. • Where trenching takes place directly downstream of a culvert/outlet/stream/drainage channel, the upstream inlet shall be blocked in order to pump the water over the road or divert by pipe through the culvert, across the trench and into the downstream channel or stream during trench excavations. • Should horizontal drilling be required to install the pipeline or conduit below and across the river channel and any wetlands then the scope of work and details (e.g. details of rig and equipment, location and footprint for horizontal drilling, etc.) must be provided to the Engineer and Environmental Manager timeously to allow for any modifications. The following must also be adhered to: – Bentonite, or a similar environmentally friendly product, may be used during the pilot drilling phase of the horizontal directional drilling. A sump to collect any overspill of bentonite must be excavated at the drilling site. The sump may be lined with HDPE plastic or over-excavated during the removal and must be demarcated to avoid falls. The work area must be demarcated with appropriate signage. – The bentonite material is to be stored in a closed container ideally fitted to a working truck on site, already mixed with water (bentonite slurry) to avoid any unnecessary spills. – Only non-potable water is to be used during the drilling process. No water is allowed to be taken from streams or wetlands. – All drill spoil or any spillage of bentonite or bentonite slurry must be removed from site by the end of the day and disposed of at a licenced WDF, with proof of disposal retained by the Contractor. • Any offcuts or shavings from the installation of pipelines or conduits must be collected and stored in appropriate containers to be taken to the site camp at the end of each day. A drop sheet to collect the shavings must be used when welding pipelines or conduits. • If an existing service/s is damaged as part of construction activities associated with the upgrade of the WWTW, the services will be reinstated immediately. • Any works taking place outside of the WWTW boundary will be monitored closely by the relevant CCT branch and the construction monitoring team.
--	--

3.44. Rehabilitation

- Disturbed areas must be rehabilitated after construction with locally indigenous plants to enhance the conservation of existing natural vegetation on site. Rehabilitation of cleared/ disturbed areas should commence as soon as possible after construction activities are completed in the affected area.
- Upon completion of each construction phase, all areas disturbed by construction activities, including the disturbed areas surrounding the new facilities and all areas utilised for the site camp and associated site camp facilities must be rehabilitated 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.
 - 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 at a licenced Waste Disposal Facility.
 - All construction waste, litter and rubble are to be removed from the site and disposed of at a licenced Waste Disposal Facility. Burying or burning of waste or rubble on site is prohibited.
 - Any temporary access routes must be closed and measures put in place to prevent future use of the access road by any person.
 - 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 should be scarified or ripped.
 - Topsoil that was removed during the establishment of the site camp should 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 replanting can take place after the replacement of the topsoil.
 - Plants “rescued” during botanical Search & Rescue can be replanted, or alternately plant material harvested as described in Section 3.19 can be utilised to re-vegetate disturbed areas.
 - Any chipped vegetation that was retained on site can be applied as a mulch 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, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) for new plant growth. Mulched material should be spread to a depth of $\pm 50\text{mm}$ – a thinner layer is likely to be ineffective in protecting the site, while thicker layers may suppress plant growth.
 - All exposed soils and recently topsoiled areas are to be re-vegetated or stabilised to the satisfaction of the Engineer and ECO, to protect these areas from wind & 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 should be removed from the site and reused elsewhere in the Municipality or disposed of at a licensed Waste Disposal Facility.
 - 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.

The table below provides a guideline to be used for planning purposes. It is recommended that this plan of action be updated, to the satisfaction of the CCT: Environmental Management Department, by an experienced individual prior to commencing with construction and rehabilitation activities.

Table 3: Proposed programme of activities for the rehabilitation of historically disturbed areas at the Macassar WWTW

Activity	When	Notes
Harvest plant material (seeds & cuttings) AND/OR place order for plant material with local nursery)	Spring & Autumn prior to rehabilitation 6-12 months before rehabilitation	The plant material (seeds, cuttings, bulbs, etc.) that will be used to revegetate the disturbed areas should be local (i.e. from the Macassar area) indigenous plants that will be suited to the enriched soil conditions of the target area. Local indigenous thicket shrub species are recommended e.g. <i>Siersia</i>, <i>Pterocelastrus tricuspidatus</i>, <i>Euclea racemosa</i>, <i>Olea</i> and <i>Salvia africana-lutea</i>. The CCT's Environmental Management Department can be contacted for advice on appropriate plant species. The required plant material may be sourced from a local indigenous plant nursery or harvested and propagated/ cultivated by an appointed person. If plant material will be obtained from a nursery, an order for the desired plant material should be placed 6-12 months in advance, to allow the nursery sufficient time to propagate the desired number of plants.
Treat kikuyu with herbicide	At least one week before planting, or earlier (during spring, summer or early autumn)	Glyphosate foliar sprays (e.g. Mamba or Round-up) are recommended, at a 3% concentration (Bromilow 2001, CapeNature 2005). Spraying of herbicides may not take place during windy conditions, on wet/damp vegetation, before or during rain / dew. The treated area should be monitored for regrowth on an annual basis for three years, and follow-up spraying and/or manual clearing should be undertaken if necessary.

	Manual removal of alien shrubs and herbaceous annuals	Before planting	Other alien plants such as <i>Erodium moschatum</i>, <i>Echium plantagineum</i> (Patterson's curse) and alien Acacias are also present on site, although not as prominent as the kikuyu grass. Alien plants and other weedy annual species should be removed by hand, ideally before flowering/ seed setting. If the plants are removed before seed setting, the plant material can be chipped/ chopped and used as mulch on site. Alternately, if the plants are in seed at the time of removal, the removed plant material must be removed from site and disposed of at a licensed Waste Disposal/Composting Facility.
	Planting of indigenous plant species	Autumn (April/May)	All seeds should be planted in autumn ahead of the winter rain. Seedlings, Cuttings and bulbs must be planted at an appropriate time of year for the plant species concerned – which may be autumn or spring. Where possible an autumn planting is preferred, to take advantage of winter rain. Planting should not take place for at least one week after the last application of herbicide. An application rate of 0.5g of seed per m² (5kg seed per ha) is recommended. Seedlings and cuttings should be planted during or just before the plant growing season. A winter/ autumn planting season is preferred, as the winter rains will assist with plant establishment. Available seedlings/ cuttings should be spread evenly across the target area, or concentrated in “clumps” across the area
	Irrigate (if possible)	Immediately after planting and possibly weekly for two months after planting.	More/less irrigation may be required, depending on rainfall and soil moisture content. If irrigation is not possible then additional plants should be planted to compensate for potential losses.
	Follow up maintenance (Operational phase)	Monthly for first 6 months after planting. Thereafter, once every 6 months for next 2.5 - 3 years thereafter.	The site will need to be monitored regularly and follow-up planting and alien clearing will need to take place as necessary to ensure the successful rehabilitation of the target areas. Alien plants to be removed via appropriate manual or chemical means, without disturbing the newly established

				indigenous species. Indigenous plants that have died to be replaced with new plants.
OPERATIONAL PHASE				
3.45. Operational Mitigation	• The 'no-go' areas of the development property must be clearly demarcated and excluded from the final layout plan. • Care must be taken to avoid the re-introduction and spread of alien invasive species. • Implement land use and land management practices that are compatible with the natural potential of the area. • Maintain ecological processes at all scales and avoid or compensate for any effects of land uses on ecological processes. • Minimize land use types that reduce ecological resilience (ability to adapt to change), particularly at the level of water catchments. • A management plan to ensure the survival of the important vegetation and protected flora on site is implicit to the expansion development of the WWTW. This plan should include control over movement through the dunes by humans and their stock. The area should have a carefully designed system of paths (and guides) for educational access. • Effluent re-use on-site and off-site should be promoted to minimize the discharge of treated effluent into the Eerste River Estuary. Non-potable water must be used for onsite irrigation and washing down of equipment. • The Employer and Contractor are responsible for ensuring that the requirements of the Operational Health & Safety Act (OHSA) are adhered to during the construction phase including the operation and maintenance (O&M) phase where the Contractor is responsible for O&M. • The Employer is responsible for ensuring compliance with the OHSA during the operational phase, i.e., after the O&M period which the contractor is responsible for. • Equipment which generates noise to be managed such that they comply with the design requirements and relevant legislation. • Odours to be managed in accordance with design requirements and relevant legislation (Section 35 (2) of NEMA:AQA 39, 2004 as amended and shall be implemented to ensure that complaints are registered due to odour nuisances.) • As part of the upgrade of the WWTW, a security hut has been allowed for to manage public access via the WWTW access road to the dunes, beach and greater estuary area. The security hut will be manned with guards and will be managed by the City of Cape Town Biodiversity Branch and its intention is to mitigate against crime in this area as well as eliminate illegal activities that take place along Tie road leading to the WWTW and surrounding dune areas. • Slope stability mitigation measures will be investigated as part of the technical design as well as long term monitoring.			

	• The public access road must be regularly assessed to monitor any potential erosion of the road and surrounding dunes. • Where birdwatchers currently have access to the existing maturation ponds, these areas will be fenced off to accommodate the expansion development and access to the new site footprint will no longer be permissible. Birdwatchers interested in accessing the maturation ponds will need to liaise directly with the WWTW's operational staff for permission to access areas within the new WWTW; the details of this agreement and arrangements (i.e., health and safety inductions, being accompanied by plant staff, hours which birding is accessible) falls outside of the purview of the upgrade of the development as this will be dealt with at an operational level.
--	--

4 COMPLIANCE

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the abovementioned project, but also with the control of how those operations are carried out. Performance with respect to environmental matters applies not only to the finished product, but also to the standard of the day-to-day operations required to complete the works.

It is thus required that the Contractor shall comply with the environmental requirements on an on-going basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a penalty as detailed below.

4.1 Penalties

Penalties will be issued for certain transgressions. Penalties may be issued per incident as per the discretion of the Engineer. Such penalties will be issued in addition to any remedial cost incurred as a result of the non-compliance with this Specification. Penalties may be issued at the Engineer's discretion, and/or upon the request/ recommendation of the ECO. The Engineer will inform the Contractor of the contravention and the amount of the penalty, and shall be entitled to deduct the amount from the monies due under the contract.

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

Penalties for the activities detailed below, will be imposed by the Engineer on the contract and/or his sub-contractors.

Table 4: Penalties for transgressions imposed on the Contractor

Transgression	Minimum Fine	Maximum Fine
a) 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	R 1 000	R 5 000
b) Failure to notify the ECO of the commencement of construction or pre-construction activities, prior to the commencement of such activities	R 1 000	R 2 000
c) Failure to comply with the provisions relating to the demarcation of all "no-go" areas, and the maintenance of the demarcated boundaries.	R 1 000	R 5 000
d) Failure to comply with the provisions relating to the clearance of vegetation on site.	R 2 000	R 5 000
e) 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.	R 1 000	R 5 000
f) Any employees, vehicles or plant, related to the Contractor's operations entering the designated boundaries of a "no-go" area.	R 1 000	R 10 000
g) Clearance of indigenous vegetation (regardless of the density of alien vegetation present) outside of the demarcated boundaries of the working area and site camp.	R 2 500	R 15 000
h) 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.	R 1 000	R 5 000
i) Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractor's operations, outside of the areas demarcated for such parking/storage.	R 500	R 5 000



Transgression	Minimum Fine	Maximum Fine
j) Persistent and un-repaired oil leaks from machinery, equipment, vehicles and plant.	R 1 000	R 10 000
k) Maintenance of vehicles, machinery or equipment outside of the designated maintenance yard, except in emergencies	R 500	R 2 000
l) Persistent failure to use, monitor and empty drip trays timeously	R 500	R 2 000
m) The contamination of soil or water due to inappropriate methods for refueling	R 500	R 2 000
n) A hazardous substances spill, pollution, fire or any damage to the environment resulting from negligence on the part of the Contractor.	R 5 000	R 20 000
o) Mixing cement or concrete on bare ground and/or failure to comply with any other provision regarding cement/ concrete batching	R1 000	R5 000
p) Failure to adhere to the provisions relating to traffic management and road safety.	R 1 000	R 10 000
q) Litter, poor waste management / housekeeping on the construction site	R 500	R 2 000
r) Deliberate lighting of illegal fires on site.	R 1 000	R 5 000
s) Employees not making use of the site ablution facilities.	R 500	R 2 000
t) Failure to adhere to the provisions relating to emergency preparedness	R 1 000	R 5 000
u) Failure to adhere to the provisions relating to environmental awareness training of construction workers, including sub-contractors and service providers rendering a service to the construction site	R 1 000	R 5 000
v) Work done outside of the agreed working hours.	R10 000	R 50 000
w) Failure to remove water that has collected in depressions or excavations on site while the site is temporarily closed.	R 1 000	R 4 000

For each subsequent similar offence, the penalty shall be doubled in value to a maximum value of R 50 000.

The value of the fine should not be less than the costs of remediating the damage (negative impact) caused by the transgression. In instances where the fine values indicated in Table 4 are not sufficient to cover the costs of remediation, the fine value must be increased appropriately or the costs must be recovered from the Contractor via an alternate means.

The Engineer must ensure that the levying of fines/penalties forms part of the contract between the Contractor and the Engineer and is subject to the provisions of South African contract law. The Engineer will inform the Contractor of the contravention and the amount of the fine and will deduct the amount from monies due in payment certificates issued under the Contract. Except where separate pay items have been measured in the Bills of Quantities, all costs in respect of complying with the EMPr are deemed to be covered by the sum tendered for complying with the EMPr.

4.2 Collection and management of fines

The Engineer is responsible for the collection and management of fines.

Monies collected via fines/ penalties may not be used for the rehabilitation of the site, or any other areas impacted by construction activities, as the Contractor is liable for the costs of remediating any environmental damage caused by the actions of the Contractor, in addition to the levied fines/ penalties. Payment of a fine/ penalty by the Contractor does not absolve the Contractor from the requirement to fund the remediation of the environmental damage caused by the Contractor. The monies collected from penalties must be used for the benefit of the local environment and may not be utilised for benefit of the Contractor, Engineer or their construction-related service providers.



The Engineer must record and report all levied fines to the ECO and must at all times be able to account for the monies collected (or “held back”) via fines/ penalties. The Engineer must at all times be able to prove that such monies have been (or will be) used to the benefit of the environment, that the monies have not been used for any other purpose, and that the monies have not been used to benefit of the Engineer, Contractor or their construction-related service providers. The Engineer must, upon request, provide proof of the management and use of the funds to the ECO, Employer or an Auditor appointed by the Employer to oversee the management of these funds.

4.3 Auditing and reporting of fines

The ECO is responsible for auditing, monitoring and reporting on all financial penalties levied against the Contractor for non-compliance with this EMPr. The Employer may appoint an additional auditor to oversee the collection and management of the penalty monies.

The Engineer must report all levied fines to the ECO and must provide the ECO with an “account statement” that reflects the management and use of the collected funds and must also provide the ECO with proof of all payments/donations made with the collected monies.

The ECO must, in each ECO report, state the fines/ penalties that have been levied on the Contractor in the preceding reporting period, the reason for the fine and the value of the fine. The total value of all fines/penalties levied to-date (i.e. the monies held-back by the Engineer) must be indicated. The final audit report produced by the ECO must report on how these monies have been spent and must provide proof thereof.

5 CONCLUSION

The EMPr is aimed at achieving “environmental best practice” which ensures environmental sustainability of the proposed upgrading of the Macassar WWTW. 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.

If the conditions, requirements and recommendations of the EMPr are implemented accordingly and adhere to the various mitigation measures, then the project should be completed without unforeseen negative environmental impacts.

The EMPr is a living document that can be amended when necessary. It is flexible and responsive to new and changing circumstances that may arise on the project.



REFERENCES

1. Sharples Environmental Services cc (2015) *Environmental Management Plan for the Upgrade and Expansion of the Existing Macassar Wastewater Treatment Works on Erf 102, Macassar.*



APPENDIX A

Method Statement Template



METHOD STATEMENT

CONTRACT:..... DATE:.....

PROPOSED ACTIVITY (give title of method statement and reference number from the EMP):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):

Note: please attach extra pages if more space is required



DECLARATIONS

1) ENVIRONMENTAL OFFICER/ ENGINEERS REPRESENTATIVE

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(signed)

(print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the EO and ER will audit my compliance with the contents of this Method Statement

(signed)

(print name)

Dated: _____

3) APPROVING AUTHORITY (Engineer)

The works described in this Method Statement are approved.

(signed)

(print name)

(designation)

Dated: _____



APPENDIX B

Construction Personnel Information Poster



ENVIRONMENTAL MANAGEMENT DO'S AND DON'TS



Workers & equipment must stay inside the site boundaries at all times



Do not swim in or drink from streams
Do not throw oil, petrol, diesel, concrete or rubbish in the stream
Do not work in the stream without direct instruction
Do not damage the banks or vegetation of the stream



Protect animals on the site
Ask your supervisor or Contract's Manager to remove animals found on site



Do not damage or cut down any trees or plants without permission
Do not pick flowers



Put cigarette butts in a rubbish bin
Do not smoke near gas, paints or petrol
Do not light any fires without permission
Know the positions of fire fighting equipment
Report all fires
Do not burn rubbish or vegetation without permission



Work with petrol, oil & diesel in areas marked for this
Report any petrol, oil & diesel leaks or spills
Use a drip tray under vehicles & machinery
Empty drip trays after rain & do not throw this water into a river



Try to avoid producing dust - wet dry ground & soil



Do not make loud noises around the site, especially near schools and homes
Report or repair noisy vehicles



Use the toilets provided
Report full or leaking toilets



Only eat in demarcated eating areas
Never eat near a river or stream
Put packaging & leftover food into rubbish bins



Do not litter - put all rubbish (especially cement bags) into the bins provided
Report full bins to your supervisor
The responsible person should empty bins regularly



Always keep to the speed limit
Drivers - check & report leaks
Ensure loads are secure & do not spill



Know all the emergency phone numbers



Fines of between R1000 and R5000
Removal from site
Construction may be stopped



Report any breaks, floods, fires, leaks and injuries to your supervisor
Ask questions!

APPENDIX C

Final Layout and No – Go Maps

APPENDIX D

Chance Finds Procedure - Heritage Western Cape (HWC)

HWC PROCEDURE: CHANCE FINDS OF PALAEOLOGICAL MATERIAL

June 2016

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO.

It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- i. The ECO or site agent must ensure that all **work ceases** immediately in the vicinity of the area where the fossil or fossils have been found;
- ii. The ECO or site agent must **inform HWC of the find immediately**. This information must include photographs of the findings and GPS co-ordinates;
- iii. The ECO or site agent must compile a **Preliminary Report and fill in the Fossil Discoveries: HWC Preliminary Record Form** within 24 hours without removing the fossil from its original position. The **Preliminary Report** records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find)
 - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.

Upon receipt of this **Preliminary Report**, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- v. **Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags.** This protection should allow for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilisation.
- vi. If the find cannot be stabilised, **the fossil may be collect with extreme care** by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: HWC PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil	Name: Contact:	
Recorder	Name: Contact:	
Photographer	Name: Contact:	



iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

In diversity there is beauty and
there is strength.

MAYA ANGELOU

Document Prepared by:

Zutari (Pty) Ltd
Reg No 1977/003711/07
1 Century City Drive
Waterford Precinct
Century City
Cape Town
South Africa
PO Box 494
Cape Town
8000
Docex: DX 204

T +27 21 526 9400

E capetown@zutari.com
W zutari.com