Western Cape Government

Department of Environmental Affairs and Development Planning

ADOPTION OF A MAINTENANCE MANAGEMENT PLAN

Request for the adoption of a Maintenance Management Plan in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") and the Environmental Impact Assessment ("EIA") Regulations, 2014.

APRIL 2024

DEPARTMENTAL DETAILS	
CAPE TOWN OFFICE: **DIRECTORATE: DEVELOPMENT MANAGEMENT (REGION 1)** (City of Cape Town, West Coast District, Cape Winelands District & Overberg District)	**GEORGE REGIONAL OFFICE:** **DIRECTORATE: DEVELOPMENT MANAGEMENT (REGION 3)** (Central Karoo District & Garden Route District)
The completed Form must be sent via electronic mail to: DEADPEIAAdmin@westerncape.gov.za Queries should be directed to the Directorate: Development Management (Region 1) at: E-mail: DEADPEIAAdmin@westerncape.gov.za Tel: (021) 483-5829 Western Cape Government Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 1) Private Bag X 9086 Cape Town, 8000	The completed Form must be sent via electronic mail to: DEADPEIAAdmin.George@westerncape.gov.za Queries should be directed to the Directorate: Development Management (Region 3) at: E-mail: DEADPEIAAdmin.George@westerncape.gov.za Tel: (044) 814-2006 Western Cape Government Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 3) Private Bag X 6509 George, 6530

IMPORTANT INFORMATION TO BE READ PRIOR TO COMPLETING THE ATTACHED FORM:

1. Purpose

The purpose of this form is to provide baseline information for the adoption of a Maintenance Management Plan ("MMP) by the competent authority.

2. Administrative requirements

This form must be used to request the competent authority to adopt a Maintenance Management Plan in terms of the NEMA EIA Regulations, 2014.

3. Maintenance Management Plan information

3.1 This form is for the adoption of a MMP and only relates to the Listed Activities as contained in Listing Notice 1, 2 and 3 of the EIA Regulations, 2014 that make provision for the adoption of a MMP.

3.2 Please note that an MMP can only be considered for activities pertaining to maintenance related work. Construction work related to new or expanded structures or infrastructure beyond the existing footprint cannot be considered as part of the request for the adoption a MMP by the competent authority.

3.3 Construction work related to new or expanded structures or infrastructure beyond the existing footprint may trigger a listed activity in terms of the EIA Regulations, 2014 and environmental authorisation may be required. If this is the case an application for environmental authorisation must be submitted to the competent authority.

3.4 Notwithstanding the MMP possibly being defined or adopted by the Competent Authority, any other applicable statutory requirements must still be complied with (e.g. any obligations under the National Water Act, 1998 (Act 36 of 1998) or the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)).

3.5 The proponent must note that a MMP for a watercourse must be undertaken through consultation with the Department of Water and Sanitation and/or the relevant Catchment Management Agency (responsible water authority). This is to ensure compliance in terms of a Permissible Water Use as set out in the National Water Act, 1998 (Act No. 36 of 1998). It is recommended that this process for authorisation in terms of the National Water Act be clarified prior to the drafting and submission of the MMP.

3.6 The adoption of a MMP does not absolve the proponent from complying with any applicable legislation or the general "duty of care" set out in Section 28(1) of the NEMA that states, "*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.*" (Note: When interpreting this "duty of care" responsibility, cognisance must be taken of the national environmental management principles contained in Section 2 of the NEMA.

3.7 Please note that the content of a MMP must include *inter alia*, the following:

- A description of the objectives of the MMP;
- A description of the relevant legislation and polices within which the MMP is prepared;
- A description of the site and a locality map;
- A description of the proposed maintenance activities;
- A description of the tasks that will be performed (method statement);
- A description of the potential impacts on the receiving environment and any management and/or mitigation measures to minimise the potential impacts associated with the maintenance activity;
- Any specialist inputs that were obtained; and
- The roles and the responsibilities of the role players who will be involved in the maintenance activity.

3.8. A public participation process must be undertaken as part of the request for the competent authority to adopt a MMP. As a minimum you will be required to:

- inform the surrounding neighbours, your local authority and the relevant water authority of your intentions (these interested and affected parties will be regarded as registered interested and affected parties);
- allow a minimum of 30 days as a commenting period for these interested and affected parties;
- obtain written comment from all relevant Organs of State and the Local Authority; and
- respond to comments received and the proof of the public participation including all comments received and responses provided thereto must be submitted to the competent authority.

4. General

4.1 *Submission of documentation, reports and other correspondence:*

The Department has adopted a digital format for corresponding with proponents/applicants or the general public. If there is a conflict between this approach and any provision in the legislation, then the provisions in the legislation prevail. If there is any uncertainty about the requirements or arrangements, the relevant competent authority must be consulted.

The Directorate: Development Management has created generic e-mail addresses for the respective Regions, to centralise their administration. Please make use of the relevant general administration e-mail address below when submitting documents:

DEADPEIAAdmin@westerncape.gov.za

Directorate: Development Management (Region 1):
City of Cape Town; West Coast District Municipal area;
Cape Winelands District Municipal area and Overberg District Municipal area.

DEADPEIAAdmin.George@westerncape.gov.za

Directorate: Development Management (Region 3):
Garden Route District Municipal area and Central Karoo District Municipal area

General queries must be submitted via the general administration e-mail for EIA related queries. Where a case-officer of DEA&DP has been assigned, correspondence may be directed to such official and copied to the relevant general administration e-mail for record purposes.

4.2 The required information must be typed within the spaces provided in the form. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. The tables may be expanded where necessary. Please make use contrasting colours in the answer blocks to improve the visibility and highlight information.

4.3 The quality, correctness and detail of information submitted by you is extremely important and it remains your responsibility to interrogate the specifics of your proposed development in order to report on the potential listed activities in this form.

4.4 This form is a guide to the information that must be submitted. Any additional information, pictorial evidence or explanations prompted by the form must be submitted along with this form in order to ensure that the competent authority does not need to request additional information from you. Incomplete forms will result in a request for additional information.

4.5 Unless protected by law all information contained in, and attached to this form, will become public information on receipt by the Department. Upon request, the Applicant/EAP must provide any interested and affected party with the information contained in or submitted with this Form.

Protection of Personal Information Act, 2013 (Act No. 4 of 2013) ("POPIA"):
Your attention is drawn to POPIA which is a comprehensive data protection legislation enacted in South Africa and came into effect on 1 July 2020. POPIA aims to give effect to the constitutional right to privacy, whilst balancing this against competing rights and interests, particularly the right of access to information. Please note that your personal information will only be used as far as it relates to the EIA process. By including your personal details in the Form and any subsequent reports and documents it will be deemed as giving consent to use this information as far as it relates to the EIA process.

4.6 This form is current as of **April 2024**. It is the responsibility of the Proponent/EAP to ascertain whether subsequent versions of the form have been released by the Department. Visit the Department's website at http://westerncape.gov.za/eadp to check for the latest version of this Form.

4.7 This form must be **duly dated and signed** by the Proponent and/or EAP (wherever applicable) and must be submitted to the Department at the details provided below.

4.8 Please note that it is an offence for a person to provide incorrect or misleading information in any form, including any document submitted in terms of the EIA Regulations to a competent authority or omits information that may have an influence on the outcome of a decision of a competent authority.

5. Circulars, Guidelines and Tools

The Department's latest Circulars pertaining to the "One Environmental Management System" and the EIA Regulations, and guidelines must be taken into account when completing this Form.

ADOPTION OF A MAINTENANCE MANAGEMENT PLAN FORM

REQUEST FOR THE ADOPTION OF A MAINTENANCE MANAGEMENT PLAN IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) ("NEMA") AND THE ENVIRONMENTAL IMPACT ASSESSMENT ("EIA") REGULATIONS, 2014.

APRIL 2024

GENERAL PROJECT DESCRIPTION

(This must Include an overview of the project including the Farm name/Portion/Erf number/the extent of the maintenance activities)

Proposed Dredging of the Milnerton Lagoon in the Diep River Estuary, Erf 20315, Milnerton, Cape Town

GENERAL REQUIREMENTS

1.1. Locality Map

A locality map must be attached to the Form, as Appendix A. The scale of the locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map. The map must include the following:

- an accurate indication of the project site position;
- road names or numbers of all the major roads as well as the roads that provide access to the site(s)
- a north arrow;
- a legend;
- the prevailing wind direction; and
- GPS co-ordinates (Indicate the position of the proposed maintenance activities on the site). The co-ordinates should be in degrees, minutes and seconds. The minutes and seconds should be to at least three decimal places. The projection that must be used in all cases is the Hartebeesthoek94 WGS84 co-ordinate system**. If maintenance activities will be undertaken along a stretch of a watercourse, the start, middle and end co-ordinates must be provided.**

PART 1: ADMINISTRATIVE DETAILS

SECTION A: DETAILS OF PROPONENT | EAP | LANDOWNER | MUNICIPALITY

Highlight the Departmental Region and District in which the intended application will fall		CAPE TOWN OFFICE (REGION 1)		GEORGE REGIONAL OFFICE (REGION 3)
		City of Cape Town	Cape Winelands District	Central Karoo District
		West Coast District	Overberg District	Garden Route District
Duplicate this section where there is more than one Proponent				
1.	Name of Proponent:	City of Cape Town		
	Contact person name (if other):	Julia Wood		
	Company/ Trading name State Department/Organ of State:	City of Cape Town: Environmental Management Department, Biodiversity Management Branch		
	Company Registration Number:	N/A		
	Postal address & Postal code:	Civic Centre, Hertzog Boulevard, Cape Town	Code	8000
	Contact numbers:	Tel. +27(0) 21 444 7793	Cell:	076 625 6395
	E-mail:	Julia.Wood@capetown.gov.za		
2.	Company of EAP/Specialists:	Infinity Environmental		
	EAP / Candidate EAP / Specialist name:	Jeremy Rose		
	EAP / Specialists registration no:	J Rose: Reg. E.A.P.: 2019/1116 K Gilmour: Candidate E.A.P.: 2024/8037		
	Postal address & Postal code:	2 Fir Street Observatory	Code	7925
	Contact numbers:	Tel. (021) 834 1602	Cell:	084 055 5678
	E-mail:	jeremy@infinityenv.co.za; kelly@infinityenv.co.za		
Duplicate this section where there is more than one Landowner				
3.	Name of landowner:	City of Cape Town		
	Name of contact person for landowner (if other):	Rachel Schnackenberg		
	Postal address & Postal code:	Civic Centre, Hertzog Boulevard, Cape Town	Code	8000
	Contact numbers:	Tel. +27(0) 21 444 7793	Cell:	+27(0)
	E-mail:	Rachel.schnackenberg@capetown.gov.za		
Duplicate this section where the is more that one person in control of the land				
4.	Name of Person in control of the land:	Dalton Gibbs		
	Contact person for 'person in control of the land' (if other):			
	Postal address & Postal code:		Code:	
	Contact numbers:	Tel. +27(0)	Cell:	+27(0)
	E-mail:	Dalton.gibbs@capetown.gov.za		
Duplicate this section where there is more than one Municipal Jurisdiction				
5.	Municipality in whose area of jurisdiction the proposed activity will be undertaken:	City of Cape Town (Northern Region: Milnerton and Kraaifontein Districts)		
	Name of contact person:	Sonja Warnich-Stemmet		
	Postal address & Postal code:	87 Pienaar Road, Milnerton, Cape Town	Code	
	Contact numbers:	Tel. +27(0) 21 444 0599	Cell:	+27(0)
	E-mail:	sonja.warnichstemmet@capetown.gov.za		

PART 2: ADOPTION OF A MAINTENANCE MANAGEMENT PLAN

SECTION B: DETAILS OF THE PROPOSED MAINTENANCE ACTIVITY(IES)

1.	Provide a detailed description of the proposed maintenance activity(ies). (Please ensure that a method statement is included for each maintenance activity.)

The Milnerton Lagoon ('lagoon' or 'estuary') is the well-known lower section of the Diep River Estuary where the Diep River enters the sea at Lagoon Beach in Cape Town (refer to **Figure 1** below). Water quality in the lagoon has declined significantly in recent years due to high levels of pollution and other anthropogenic impacts. The effects of poor water quality in the estuary include a sulphurous odour and discoloured water, due to high levels of suspended solids and extremely low oxygen levels.

Sewage-derived pollution is a major contributor to water quality impacts in the estuary and includes excessive loading of organic solids from the Potsdam wastewater treatment works (WWTW). During 2024 and 2025, the lagoon has also been affected by the discharge of large volumes of untreated sewage because of the episodic failure of the Koeberg Road sewage pump station and its resulting discharges into the Theo Marais stormwater canal upstream of Otto du Plessis Drive).

In addition to the ongoing effects of inflowing pollutants, water quality in the lower estuary is affected by the extent to which clean seawater can enter the lagoon during high tides, replacing polluted river flows with cooler, saline water with higher dissolved oxygen concentrations. This daily tidal exchange is dependent on the dynamics of the estuary mouth, coastal processes, and flows from the river. In general, greater tidal exchange has been associated with improved water quality in the lower lagoon (between the Loxton Road bridge and the mouth). Tidal exchange is reduced when the mouth is partially closed, which is influenced by many different factors including deposition of sediments at the mouth. Organic sediments derived from wastewater and urban runoff accumulate on the bed of the estuary over time and are periodically flushed out to sea in large flood events. Accumulated organic-rich sediments increase the demand for oxygen from the water column as microbes decompose the material. This process reduces the levels of dissolved oxygen concentrations in the estuary. If there is insufficient oxygen available in the water (as is often the case in the lagoon), conditions turn anoxic, allowing certain bacteria to produce hydrogen sulphide, resulting in characteristic foul odours.

The proposed activity is the dredging (with or without off-site disposal) of the lower section of the Milnerton Lagoon from just upstream of the Loxton Road bridge to the estuary mouth with the placement of dredged sediment along channel margin(s) (refer to **Figure 2** and **3** below).

Up to 30 000 m^3 of material will be moved within the lagoon to achieve this during the dredging phase of the project, and up to 120 000 m^3 during the post-dredging phase to maintain the scoured depth of the dredged channel and an open estuary mouth in accordance with the MMP (see Appendix H2 of the Basic Assessment Report [BAR]), as and when needed to ensure the hydrodynamic function of the lower lagoon is maintained. Furthermore, should partial off-site disposal be the implemented design and layout alternative (refer to Design and Layout Alternative 5 below) then the dredged material would be separated by cyclone, with clean sand returned to the lagoon (i.e., with placement of sediment particularly on the eastern bank of the channel) and approximately 6 000 m^3 of nutrient-enriched fine sediments dewatered and removed off-site (see **Figure 3** below).

The main purpose of the dredging is to maximise tidal flushing and improve the hydrodynamics of the lower section of the lagoon. The dredged material is proposed to be placed on the side(s) of the dredge channel to form sand banks. Additional benefits associated with this sediment placement on the side of the channel include exposure of the deposited sediment to ultraviolet

(UV) light and oxygen during low tide, which can reduce odours and increase the rate of decomposition of organic materials.

Figure 1: Locality map indicating the site located on Erf 20315, within the Milnerton Lagoon.

The various sensitivities and contextual constraints presented by the site resulted in two potential design and layout alternatives, which together with the no-go alternative were considered for this application:

- **Alternative 1 *(Preferred Alternative)*- Dredging with placement of material within the lagoon:**
  This option involves dredging approximately 30,000 m³ of sediment from the channel and placing it on the sides of the dredged area to build up sandbanks within the intertidal zone – refer to **Figure 2** below. During the post-dredging phase of the project, up to 120 000 m³ of sediment will be dredged from the channel and/or estuary mouth, and placed on the sides of the channel within the intertidal zone and an open estuary mouth maintained in accordance with the MMP (see Appendix H2 of the BAR), as and when needed to ensure the hydrodynamic function of the lower lagoon is maintained.
  These sandbanks would be naturally exposed to cycles of oxygen and ultraviolet light (UV) through wetting and drying, assisting in the breakdown of organics. Importantly, this option does not require off-site disposal or dewatering, thereby will not take up scarce landfill space nor involve the excessive transport and loading to move sediment off-site to an appropriate and capacitated landfill site, making it the least costly and least disruptive alternative. Dredging could be completed in approximately five months, with impacts limited to the dredged footprint and without significant loss of public space.
- **Alternative 5 *(Least Preferred)* – Dredging of the channel with partial off-site disposal:**
  This option involves dredging of up to 30,000 m³ of material, which would be separated by cyclone, with clean sand returned to the lagoon (i.e., with placement of sediment particularly on the eastern bank of the channel) and only around 6 000 m³ of nutrient-enriched fine sediments dewatered and removed off-site (refer to **Figure 3** below). During the post-dredging phase of the project, up to 120 000 m³ of sediment will be dredged to maintain the scoured depth of the dredged channel and an open estuary mouth and

placed on the eastern side of the channel within the intertidal zone in accordance with the MMP (see Appendix H2 of the BAR), as and when needed to ensure the hydrodynamic function of the lower lagoon is maintained.

- **The No-Go Alternative**: Entails maintenance of the *status* quo and therefore not implementing dredging (with or without off-site disposal) in the Milnerton Lagoon. This option would essentially ensure the persistence of the lagoon's current degraded state without any remedial relief, and the likely heightened public scrutiny for the City's failure to respond to the effects of pollution within the lagoon (refer Section G, question 8 above for more detail on the socio-economic aspects of the project).
  Under this option, the hydrodynamic functioning of the lagoon would not be markedly improved but instead will remain limited in tidal flushing with periodic mouth closure and increased retention of freshwater during summer with high evaporation rates, resulting in the development of a reverse salinity gradient. While winter flooding may cause natural and temporarily improved intertidal exchange, this is inconsistent and insufficient to support lasting ecological recovery.

Given the continued environmental degradation and potential to lose out on socio-economic opportunities under the No-Go Alternative, it is considered neither reasonable nor feasible. The implementation of the proposed dredging (with or without off-site disposal) and sediment placement activity is therefore strongly preferred, as it offers clear, tangible short- to medium-term benefits for the hydrodynamic function of the lower lagoon, with the subsequent potential to pose a positive indirect impact both on estuary ecosystem health and upon local community well-being.

Figure 2: Schematic representation of the proposed dredging of a central scour channel (indicated by the blue polygon) within the lower Milnerton Lagoon with placement of material along the channel margins as indicated by the yellow polygons.

The main purpose of the dredging is to maximise tidal flushing and improve the hydrodynamics of the lower section of the lagoon. The creation of a dredge channel is intended to increase flow velocities and help keep fine material suspended so that it can be flushed out to sea during tidal

cycles. The dredged material is proposed to be placed on the sides of the dredge channel to form sand banks. Additional bioremediation benefits associated with this sediment placement on the side of the channel include exposure of the deposited sediment to ultraviolet (UV) light and oxygen during low tide, which can reduce foul odours, pathogens, and labile organics such as dissolved organic carbon.

Figure 3: This schematic presents the design and layout Alternative 5 – the proposed dredging with off-site disposal.

The main purpose of the dredging is to maximise tidal flushing and improve the hydrodynamics of the lower section of the lagoon. The creation of a dredge channel is intended to increase flow velocities and help keep fine material suspended so that it can be flushed out to sea during tidal cycles. The dredged material is proposed to be placed on the sides of the dredge channel to form sand banks. Additional bioremediation benefits associated with this sediment placement on the side of the channel include exposure of the deposited sediment to ultraviolet (UV) light and oxygen during low tide, which can reduce foul odours, pathogens, and labile organics such as dissolved organic carbon.

Limitations of dredging as a remediation measure

It must be clearly stated that **dredging (with or without off-site disposal) of the Milnerton Lagoon is not in itself expected to contribute significantly to improving water quality or amenity value of this waterbody other than by improving tidal exchange in the lower part of the lagoon**. The causes of water quality impacts are well understood and include the current inadequate treatment of wastewater at the Potsdam WWTW, the periodic discharge of substantial volumes of untreated sewage from failing pump stations and the ongoing low-level runoff of untreated wastewater from un-serviced areas of the catchment. As assessed in this report, the positive impacts of dredging as a remediation measure are likely to be limited in extent (since improvements to tidal exchange will occur mainly in the lower lagoon) and duration (as winter flooding may cause the channel to revert to its current channel). Therefore, the dredging of the lower lagoon is preferably recommended after some improvement in water quality occurs, ensuring that the intervention coincides with improvements in upstream water quality. Dredging (with or without off-site disposal) is

	therefore recommended as a short- to medium-term intervention that can feasibly be implemented to help address pollution within the Milnerton Lagoon considering the complimentary maintenance activities ensuring the dredged channel depth is maintained and the estuary mouth kept open. The **proposed maintenance activities involve maintenance of an open estuary mouth and maintenance of the depth of the scoured channel within the lower lagoon**, i.e., at 1 m below land levelling datum (LLD), during the post-dredging phase of the Milnerton Lagoon Dredging project. **Method statements describing proposed maintenance activities** Refer to **Section 4.3** of the MMP for the Method Statements required of the relevant Contractor and/or Sub-contractor for the types of maintenance activities anticipated to occur in and around the estuary mouth during the post-dredging phase of the Milnerton Lagoon Dredging project. It is anticipated that the Authorisation Holder will oversee the works and provide for additional mitigation of specific impacts, where required.

2.	Clearly describe the current state of the area where the maintenance activities will take place. (This must be supported by recent colour photographs)

Introduction:

Water quality in the lagoon has declined significantly in recent years due to high levels of pollution ingress and other anthropogenic impacts. The high levels of suspended solids and extremely low oxygen levels in the lagoon have led to persistently poor water quality, which presents with sulphurous odours and discoloured water (refer to **Images 1 & 2** below).

Images 1 & 2: Discoloured water pictured within the Milnerton Lagoon. Image on the left was taken during November 2022 upstream of the site, near the Potsdam Waste Water Treatment Works outlet valve and the image on the right was taken during November 2024 near the Theo Marais outlet valve into the Theo Marais canal.

Sewage-derived pollution is the largest contributor to the impoverished water quality in the lagoon with major impacts including excessive loading of organic waste primarily from the Potsdam wastewater treatment works (WWTW), particularly since its rapid deterioration in efficacy since 2019, with a sharpened decline in 2022. Other sources of pollution include urban stormwater runoff with contaminant loads from roads, gardens, and industrial areas, which are sporadically and increasingly contaminated with raw sewage due to failed or blocked pipelines and pump station overflows, catchment development and abstraction (reducing natural flows) and a cumulative buildup of nutrient-rich, organic sediments over the past 20 years. During 2024 and 2025, the lagoon was further affected by the discharge of large volumes of untreated sewage because of the episodic failure of the Koeberg Road sewage pump station and its resulting discharges into the Theo Marais stormwater canal (a contributor to the lagoon - specifically discharging into the Diep River channel upstream of Otto du Plessis Drive).

In addition to the ongoing effects of inflowing pollutants, water quality in the lower estuary is affected by the extent to which clean seawater can enter the lagoon during high tides, replacing polluted river flows with cooler, saline water with higher dissolved oxygen concentrations. This daily tidal exchange is dependent on the dynamics of the estuary mouth, coastal processes, and flows from the river. In general, greater tidal exchange has been associated with improved water quality in the lower lagoon (between the Loxton Road bridge and the mouth). Tidal exchange is reduced when the mouth is partially closed, which is influenced by many different factors, including increased deposition of sediments at the mouth. Organic sediments derived from wastewater and urban runoff accumulate on the bed of the estuary over time and are periodically flushed out to sea in large flood events. Accumulated organic-rich sediments increase the demand for oxygen from the water column as microbes decompose the material. This process reduces the levels of dissolved oxygen concentrations in the estuary. If there is insufficient oxygen available in the water (as is often the case in the lagoon), conditions turn anoxic, allowing certain bacteria to produce hydrogen sulphide, resulting in characteristic foul odours.

Images 3: Mouth of the Milnerton lagoon is pictured here with an open tidal exchange with the sea.

Current State of the Site:

Hydrodynamic modelling of the proposed dredging described in the Water Quality Remediation Plan for the Milnerton Lagoon was prepared for the City of Cape Town in 2023 (interchangeably referred to as the '2023 Remediation Plan'), found that the proposed dredged channel down the centre of the lower lagoon would facilitate greater saline intrusion and saline wedge[1] development during incoming and outgoing tides. The dredged channel is expected to increase the exchange of saline and fresh water in the lower lagoon, essentially aiding in flushing of the lagoon. Moreover, the increased seawater intrusion introduces dissolved oxygen into the lagoon, reducing chemical oxygen demand and disrupting anoxic conditions. During the dry season, average salinities near the mouth of the lagoon are modelled to increase by 11.6 %. During the wet season, average salinities near the mouth are modelled to increase by 54.0 % in the lower water column.

[1]A saline wedge is the term used to describe the density separation in the water column of an estuary that occurs when tidal motion is very weak or absent. This 'wedge' develops with the intrusion of seawater in an estuary as a wedge-shaped bottom layer, which hardly mixes with the overlying freshwater layer.

Since the 2023 Remediation Plan, there have been multiple flood events that have naturally scoured the system, flushing significant quantities of sediment from the lagoon out to sea, therefore the removal of organic sediments has become less of a priority. To improve water quality in the lower reaches of the lagoon, instead dredging has been proposed for its potential to improve the hydrodynamics and tidal exchange as a viable remediation measure.

Dredging alone is not expected to achieve the desired permanent ecological, human health and/or aesthetic outcomes within the Milnerton Lagoon unless there is a significant change at a catchment scale, reducing the routing of major pollutants into the Diep River. However, dredging is proposed for pursuit as part of a suite of complementary interventions, with a specific focus on improving tidal exchange in the lower Milnerton Lagoon. These complementary interventions include the upgrading and expansion of the Potsdam WWTW to increase the capacity and efficacy of treatment, and the upgrading of the Koeberg Road and Phoenix sewage pump stations amongst the potential application for/implementation of other remediation interventions assessed within the 2023 Remediation Plan.

The maintenance activities associated with the post-dredging phase of the proposed dredging of the lower reaches of the Milnerton Lagoon is the subject of this Maintenance Management Plan (MMP).

3.	Property location																								
		Approximately 1.12 km lower section of the lagoon, located within Erf 20315, that extends from the lagoon mouth, south-west of Woodbridge Island, extending just north of the Wooden Bridge.																							
4.	Erf/Farm name(s), number(s) and portion(s)																								
		Erf 20315																							
5.	Property size(s) (m^2) of all proposed sites:																								
		859 168.2 m^2																							
6.	SG Digit code(s) of the all the proposed property(ies)																								
(description of cadastral unit)		C	0	1	6	0	0	3	4	0	0	0	2	0	3	1	5	0	0	0	0	0			
7.	Coordinates of the proposed site(s) where the maintenance activity/ies will be conducted:																								
	Point just north of the Wooden Bridge *(most upstream position of the site)*																								
	Latitude (S)	**33º**						**52'**						**52.06"**											
	Longitude (E)	**18º**						**29'**						**23.45"**											
	Estuary mouth *(most downstream position of the site)*																								
	Latitude (S)	**33º**						**53'**						**22.47"**											
	Longitude (E)	**18º**						**29'**						**4.49"**											

Note: If the maintenance activities will be undertaken along a linear stretch such as a watercourse, the start, middle and end co-ordinates must be provided.

SECTION C: POTENTIAL LISTED ACTIVITIES THAT YOU REGARD TO BE APPLICABLE TO THE PROPOSED MAINTENANCE ACTIVTY(IES)

All activities listed in terms of the EIA Regulations, 2014 that may be associated with the proposed maintenance activities must be provided below.

Activity No(s):	Provide the relevant **Activities** as set out in **Listing Notice 1**	Describe the portion of the proposed development to which the applicable listed activity relates.
19A(ii)	The **infilling or depositing of any material of more than 5 cubic metres into**, or the **dredging, excavation, removal or moving of soil, sand**, shells, shell grit, pebbles or rock **of more than 5 cubic**	The activities considered in this Maintenance Management Plan (MMP) concern the maintenance of the dredged channel depth and an open estuary mouth during the post-dredging phase.

	metres from— the littoral active zone, **an estuary** or a distance of 100 metres inland of the highwater mark of the sea or an estuary, whichever distance is the greater;	These maintenance activities involve the dredging and moving of up to 120 000 m^3 in future maintenance to maintain a scour channel and open estuary mouth in accordance with this MMP. The width of the dredged channel will be approximately 20 m, with its bottom at 1 m below land levelling datum (LLD) and side slopes with a 1:5 slope. Excavated material is to be placed and spread at 0.5 m above LLD to create flats in the intertidal zone on the sides of the channel. Sandbags may be needed at the site access point(s) - especially at the existing ramp from the main beach parking area - to address natural scouring and improve stability, as soft sand and erosion may hinder site access. Thus, the maintenance activities will result in the infilling, depositing of dredged material into, and the dredging of more than 5 m^3 from, the lower section of the Milnerton Lagoon, which forms part of the Diep River Estuary, as part of maintenance or repeated dredging efforts in the future.
Activity No(s):	Provide the relevant **Activities** as set out in **Listing Notice 2**	Describe the portion of the proposed development to which the applicable listed activity relates.
None		
Activity No(s):	Provide the relevant **Activities** as set out in **Listing Notice 3**	Describe the portion of the proposed development to which the applicable listed activity relates.
None		

PART 3 DECLARATIONS

SECTION A: DECLARATION OF THE PROPONENT

Note: Duplicate this section where there is more than one Proponent.

I, JULIA WOOD ID Number: 6 5 0 4 2 2 0 1 0 8 0 8 3

in my personal capacity or duly authorised thereto hereby declare/affirm that:

- the information provided or to be provided as part of this form, is true and correct;
- I am fully aware of my responsibilities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), the Environmental Impact Assessment ("EIA") Regulations, as defined in Chapter 5 of NEMA (as amended) and any relevant Specific Environmental Management Acts and that failure to comply with these requirements may constitute an offence in terms of relevant environmental legislation;
- I am aware that is an offence in terms of Section 24F of the NEMA should I commence with a listed activity prior to obtaining an Environmental Authorisation;
- I am aware of my general duty of care in terms of Section 28 of the NEMA;
- I will provide the EAP and specialist, where applicable, and the competent authority with access to all information at my disposal that is relevant to the application;
- I will be responsible for the costs incurred in complying with the EIA Regulations, 2014 and other environmental legislation including but not limited to –
  - costs incurred for the appointment of the EAP or any person contracted by the EAP; and
  - costs in respect of any specialists, if any.

Note: If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

Julia Wood Digitally signed by Julia Wood Date: 2026.01.28 16:35:44 +02'00'

Signature of the Proponent:

28 January 2026

Date:

CITY OF CAPE TOWN

Name of company (if applicable):

SECTION B: DECLARATION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER ("EAP")/SPECIALIST

I, JEREMY ROSE	EAP / Specialist Registration Number:	2	0	1	9	/	1	1	1	6

as the appointed EAP / Specialist hereby declare/affirm that:

- my EAP / Specialist Registration is current and up to date, and will inform the proponent and Department if the registration should lapse;
- the information provided or to be provided as part of this form, is true and correct;
- I have disclosed/will disclose, to the Proponent, the specialist (if any), the competent authority and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document prepared or to be prepared as part of the request for the adoption of a Maintenance Management Plan;
- I have ensured/will ensure that information containing all relevant facts in respect of the request for the adoption of a Maintenance Management Plan was/will be distributed or was/will be made available to registered interested and affected parties and that participation will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- I have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the competent authority;
- I have ensured/will ensure the inclusion of inputs and recommendations from any specialists in respect of the request for the adoption of a Maintenance Management Plan, where relevant;
- I have kept/will keep a register of all interested and affected parties that participated in the public participation process; and
- I am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014.

Signature of the EAP/Specialist:

28 JANUARY 2026

Date:

INFINITY ENVIRONMENTAL (PTY) LTD

Name of company (if applicable):

Final Maintenance Management Plan

Proposed Dredging of the Milnerton Lagoon, Cape Town

PREPARED IN COMPLIANCE WITH THE REQUIREMENTS OF THE EIA REGULATIONS, GN 326 OF 2017 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, ACT NO. 107 OF 1998

DEA&DP REF NO. 16/3/3/1/A1/18/3048/25

DATE: 28 January 2026

APPLICANT
City of Cape Town

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

Written comments should be submitted to the Environmental Assessment Practitioner, Infinity Environmental, at the details below or online at

www.infinityenv.co.za

Infinity Environmental

Email: milnerton@infinityenv.co.za
Tel: 021 834 1600
Collingwood Building, Black River Park
2 Fir Street, Observatory, Cape Town

REPORT DETAILS

PROPOSED DREDGING OF THE MILNERTON LAGOON, CAPE TOWN: FINAL MAINTENANCE MANAGEMENT PLAN

APPLICANT

City of Cape Town
9 Dorp Street
Cape Town, 8000

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Infinity Environmental (Pty) Ltd.
Collingwood Building
Black River Park
2 Fir Street, Observatory

Contact
comments@infinityenv.co.za
www.infinityenv.co.za

Authors

T Hobson M.S.c., (Reg. E.A.P. #2019/1018)
J Rose B.Sc.Hons (Reg. E.A.P. #2019/1116)

Report purpose

This Maintenance Management Programme is prepared as part of a Basic Assessment in terms of the Environmental Impact Assessment Regulations, 2014 (as amended). It prescribes control methods to mitigate and manage negative environmental impacts and enhance positive impacts associated with the maintenance of the lower reaches of the Milnerton Lagoon post-dredging, and provides a programme for monitoring the performance of personnel in applying such methods.

DOCUMENT CONTROL

Date	Version
05 November 2025	Draft
28 January 2026	Final

DECLARATION OF EAP'S INDEPENDENCE

I, Jeremy Rose, appointed by the City of Cape Town as Environmental Assessment Practitioner for the Final Maintenance Management Plan, hereby declare that the information provided in this report and supporting documentation is complete and correct to the best of my knowledge; that other than fair remuneration for work performed in terms of this application I have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; that I have disclosed, to the Applicant, the specialist(s), the Competent Authority and registered interested and affected parties all material information that have or may have the potential to influence the decision of the Competent Authority; that I have ensured that information in respect of the application was distributed or was made available to registered interested and affected parties and that participation will be facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments; and that I am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations.

Jeremy Themba Rose BSc (Hons), Reg. E.A.P. 2019/1116, Pr.Sci.Nat. 120148, IAIAsa member 5781
Infinity Environmental (Pty) Ltd: Director & Principal EAP

RECORD OF REVISIONS

Rev. No.	Reason for Revision	Section Revised	Revised By	Effective Date
00	DRAFT	ALL	T HOBSON	29 October 2025
00	FINAL	ALL	J ROSE	28 January 2026

MMP OVERVIEW

Section 1	**INTRODUCTION**
Section 2	**APPROACH AND STRUCTURE**
Section 3	**PROJECT ROLES AND ORGANISATIONAL STRUCTURE**
Section 4	**MAINTENANCE MANAGEMENT PLAN**
Section 5	**TOLERANCE FOR NON-COMPLIANCE**
Section 6	**CONCLUSION**
Section 7	**BIBLIOGRAPHY**

ANNEXURES

Annexure A	**ENVIROMENTAL AWARENESS TRAINING PLAN**

TERMS AND ACRONYMS

BAR	Basic Assessment Report
DO	Dissolved Oxygen
EAP	Environmental Assessment Practitioner
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry Fisheries and the Environment
MMP	Maintenance Management Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008), as amended

INTRODUCTION

The Milnerton Lagoon ('lagoon' or 'estuary') is the lower section of the Diep River Estuary where the Diep River enters the sea at Lagoon Beach in Cape Town (refer to **Figure 1** below). Water quality in the lagoon has declined significantly in recent years due to high levels of pollution and other anthropogenic impacts. The effects of poor water quality in the estuary include a sulphurous odour and discoloured water, due to high levels of suspended solids and extremely low oxygen levels.

Sewage-derived pollution is a major contributor to water quality impacts in the estuary, and includes excessive loading of organic solids from the Potsdam wastewater treatment works (WWTW). During 2024 and 2025, the lagoon has also been affected by the discharge of large volumes of untreated sewage because of the episodic failure of the Koeberg Road sewage pump station and its resulting discharges into the Theo Marais stormwater canal upstream of Otto du Plessis Drive).

In addition to the ongoing effects of inflowing pollutants, water quality in the lower estuary is affected by the extent to which clean seawater can enter the lagoon during high tides, replacing polluted river flows with cooler, saline water with higher dissolved oxygen concentrations. This daily tidal exchange is dependent on the dynamics of the estuary mouth, coastal processes, and flows from the river. In general, greater tidal exchange has been associated with improved water quality in the lower lagoon (between the Loxton Road bridge and the mouth). Tidal exchange is reduced when the mouth is partially closed, which is influenced by many different factors including deposition of sediments at the mouth. Organic sediments derived from wastewater and urban runoff accumulate on the bed of the estuary over time and are periodically flushed out to sea in large flood events. Accumulated organic-rich sediments increase the demand for oxygen from the water column as microbes decompose the material. This process reduces the levels of dissolved oxygen concentrations in the estuary. If there is insufficient oxygen available in the water (as is often the case in the lagoon), conditions turn anoxic and bacteria produce hydrogen sulphide, resulting in characteristic foul odours. The proposed activity is the dredging of the lower section of the Milnerton Lagoon from just upstream of the Loxton Road bridge to the estuary mouth and the placement of dredged sediment along channel margins (refer to **Figure 2** below).

Up to 30 000 m^3 of material will be moved within the lagoon to achieve this during the dredging phase of the project, and up to 120 000 m^3 during the post-dredging phase to maintain the scoured depth of the dredged channel and an open estuary mouth in accordance with this MMP, as and when needed to ensure the hydrodynamic function of the lower lagoon is maintained.

The main purpose of the dredging is to maximise tidal flushing and improve the hydrodynamics of the lower section of the lagoon. The dredged material is proposed to be placed on the sides of the dredge channel to form sandbanks. Additional benefits associated with this sediment placement on the sides of the channel include exposure of the deposited sediment to ultraviolet (UV) light and oxygen during low tide, which can reduce odours and increase the rate of decomposition of organic materials.

Figure 1: Locality map indicating the site located on Erf 20315, within the Milnerton Lagoon.

CURRENT & PLANNED POLLUTION REMEDIATION WITHIN THE GREATER DIEP RIVER ESTUARY

In response to the impacts on waterbodies caused by failing sewage infrastructure, the Applicant, the City of Cape Town ('the City'), has initiated a series of ongoing and planned projects to reduce pollution in the canal and estuary and to upgrade infrastructure across the catchment. Current pollution response actions include routine unblocking and repair of sewers, investigations and enforcement of pollution incidents, increased maintenance frequency at the Koeberg Pump Station, and water pressure reduction in parts of the catchment.

In addition, major infrastructure upgrades are underway or scheduled, including:

- the upgrading and expansion of the Potsdam Wastewater Treatment Works (scheduled for completion by December 2027);
- A capacity upgrade and construction of an overflow pond at Koeberg Road Pump Station (2027);
- Construction of the new Montague Gardens Bulk Sewer (2026);
- Rehabilitation of the Montague Drive Bulk Sewer (2027);
- Upgrades to the Phoenix Park Pump Station (2028); and
- Upgrades to the Sanddrif East Pump Station (June 2027).

PROJECT BACKGROUND AND MOTIVATION

The Diep River Estuarine Management Plan (adopted in 2022) includes a set of objectives and actions, of which Objective H1 and Action 12 involve the following, '*Assess the possible cost and benefit of dredging the lower lagoon to facilitate the release of sediments and nutrient loads and*

emulate natural scour and enable ingress of increased volumes of seawater into the system… Implement dredging if a significant benefit is anticipated.' (refer to pg 9. of the EMP (2022)).

A Water Quality Remediation Plan for the Milnerton Lagoon was prepared for the City of Cape Town in 2023 (Rose et al., 2023), 'the 2023 Remediation Plan', which assessed various short-, medium- and long-term remediation measures proposed for the lagoon and recommended that the primary focus of remediation of the pollution within the lagoon should be on reducing the sources of pollution into the estuary. Of the short-term remediation measures assessed in the 2023 Remediation Plan, one that was recommended for implementation was dredging of the lagoon to remove built-up organic sediments and increase tidal exchange in the estuary.

Hydrodynamic modelling of the proposed dredging has been conducted and found that the proposed dredging would facilitate greater saline intrusion during incoming and outgoing tides in the lower part of the lagoon. The dredging is expected to increase the exchange of saline and fresh water in the lower lagoon. The increased seawater intrusion is also expected to introduce dissolved oxygen into the lagoon, reducing chemical oxygen demand and disrupting anoxic conditions. During the dry season, average salinities near the mouth of the lagoon are modelled to increase by 11.6 %. During the wet season, average salinities near the mouth are modelled to increase by 54.0 % in the lower water column.

Since 2023, multiple flood events have naturally scoured the system, flushing significant quantities of sediment from the lagoon out to sea. The removal of organic sediments has become less of a priority, and dredging is instead proposed for its potential to improve the hydrodynamics and tidal exchange as a viable remediation measure.

Dredging alone is however not expected to achieve the desired permanent ecological, human health and/or aesthetic outcomes within the Milnerton Lagoon unless there is a significant reduction in polluted inflows into the Diep River. It is therefore proposed that the implementation of dredging be delayed until water quality inflows into the lagoon reach acceptable levels, defined here in terms of dissolved oxygen as the 90th percentile of oxygen concentrations in bottom waters being above the 1.0 mg/L threshold over a three-month period with weekly monitoring, and the 90th percentile in mid- and surface water concentrations being above 2.0 mg/L.

The proposed dredging of the lower reaches of the Milnerton Lagoon is the subject of this Maintenance Management Plan (MMP).

This report has been prepared to meet and support the requirements for MMP approval. The Department of Environmental Affairs and Development Planning (DEA&DP), as the competent authority, is requested to review this document and issue a decision on the adoption of this MMP.

1.1 ALTERNATIVES

The various sensitivities and contextual constraints presented by the site resulted in two potential design and layout alternatives, which together with the no-go alternative were considered for this application:

- **Alternative 1 *(Preferred Alternative)*- Dredging with placement of material within the lagoon:** This option involves dredging approximately 30,000 m³ of sediment from the channel and placing it on the sides of the dredged area to build up sandbanks within the intertidal zone – refer to **Figure 2** below. During the post-dredging phase of the project, up to 120 000 m^3 of sediment will be dredged from the channel and/or estuary mouth, and placed on the sides of the channel within the intertidal zone and an open estuary mouth maintained in accordance with the MMP (see **Appendix H2**), as and when needed to ensure the hydrodynamic function of the lower lagoon is maintained.

These sandbanks would be naturally exposed to cycles of oxygen and ultraviolet light (UV) through wetting and drying, assisting in the breakdown of organics. Importantly, this option does not require off-site disposal or dewatering, thereby will not take up scarce landfill space nor involve the excessive transport and loading to move sediment off-site to an appropriate and capacitated landfill site, making it the least costly and least disruptive alternative. Dredging could be completed in approximately five months, with impacts limited to the dredged footprint and without significant loss of public space.

This proposed intervention includes the creation of a berm upstream of the small island at the Wooden Bridge, using 600 m^3 of dredged material, as a means to potentially concentrate flows west of the island and increase flow velocities.

- **Alternative 5 *(Not Preferred)* – Dredging of the channel with partial off-site disposal:** This option involves dredging of up to 30,000 m^3 of material, which would be separated by cyclone, with clean sand returned to the lagoon (i.e., with placement of sediment particularly on the eastern bank of the channel) and only around 6 000 m^3 of nutrient-enriched fine sediments dewatered and removed off-site (refer to **Figure 3** below). During the post-dredging phase of the project, up to 120 000 m^3 of sediment will be dredged to maintain the scoured depth of the dredged channel and an open estuary mouth and placed on the eastern side of the channel within the intertidal zone in accordance with the MMP (see **Appendix H2**), as and when needed to ensure the hydrodynamic function of the lower lagoon is maintained.

  The intervention involves forming a berm upstream of the small island at the Wooden Bridge, using approximately 600 m^3 of dredged material, to help direct flows to the west of the island and enhance flow velocities.

- **The No-Go Alternative**: Entails maintenance of the *status quo* and therefore not implementing dredging in the Milnerton Lagoon. Under this option, the hydrodynamic functioning of the lagoon would remain dependent on natural processes, potentially with limited tidal flushing and increased retention of freshwater during summer. While winter flooding may cause natural and temporarily improved intertidal exchange, this has proven insufficient to support lasting ecological recovery.

Given the continued impacts on the lagoon, the No-Go Alternative is considered neither reasonable nor feasible. The implementation of the proposed dredging is therefore preferred, as it offers clear, potential short- to medium-term benefits for the hydrodynamic function of the lower lagoon, with the subsequent potential to pose a positive indirect impact both on estuary ecosystem health and upon local community well-being.

Figure 2: Schematic of the updated preferred alternative, illustrating the proposed dredging area (blue) in the Milnerton Lagoon, with the excavated material (yellow polygons) placed on either side of the channel. The proposed sand berm is highlighted in orange, while the dotted outline depicts the precise footprint of the dredged area. The design has been amended slightly since the draft BAR based on comments received, to maintain deeper water along the western bank immediately downstream of the Loxton Road bridge.

The main purpose of the dredging is to maximise tidal flushing and improve the hydrodynamics of the lower section of the lagoon. The creation of a dredge channel is intended to increase flow velocities and help keep fine material suspended so that it can be flushed out to sea during tidal cycles. The dredged material is proposed to be placed on the sides of the dredge channel to form sandbanks. Additional bioremediation benefits associated with this sediment placement on the side of the channel include exposure of the deposited sediment to ultraviolet (UV) light and oxygen during low tide, which can reduce foul odours, pathogens, and labile organics such as dissolved organic carbon.

Figure 3: This schematic presents the design and layout Alternative 5 – the proposed dredging with off-site disposal.

Limitations of dredging as a remediation measure

It must be clearly stated that dredging of the Milnerton Lagoon is not in itself expected to contribute significantly to improving water quality or amenity value of this waterbody other than by improving tidal exchange in the lower part of the lagoon. The causes of water quality impacts are well understood and include the discharge of wastewater at the Potsdam WWTW, the periodic discharge of substantial volumes of untreated sewage from failing pump stations and the ongoing low-level runoff of untreated wastewater from un-serviced areas of the catchment. As assessed in this report, the positive impacts of dredging as a remediation measure are likely to be limited in extent (since improvements to tidal exchange will occur mainly in the lower lagoon) and duration (as winter flooding may cause the channel to revert to its current channel). Therefore, the dredging of the lower lagoon is preferably recommended after some improvement in water quality occurs, ensuring that the intervention coincides with improvements in upstream water quality. Dredging is therefore recommended as a short- to medium-term intervention that can feasibly be implemented to help address pollution within the Milnerton Lagoon considering the complimentary maintenance activities ensuring the dredged channel depth is maintained and the estuary mouth kept open.

1.2 Environmental Sensitivities

The proposed site is the lower reaches of the Milnerton Lagoon: a part of the Diep River Estuary with significant tidal influence. Rietvlei wetland, fed by the Diep River habitat, is located north of the Milnerton Lagoon and is 5 km north-east of the Cape Town harbour. The Diep River originates from the Riebeek Kasteel Mountains north-east of the town of Malmesbury, flowing south-west for approximately 65 km towards the estuary in Cape Town. The lower catchment of the Diep River in Cape Town is highly urbanised, and the estuary is confined to a channel stabilised by road

embankments and bridges with a maximum width of 150 m. The estuary mouth naturally migrates between a gabion structure and concrete wall to the south and the Woodbridge Island, a naturally raised area approximately 250 m north of the mouth.

The City of Cape Town's Biodiversity Spatial Plan (BSP), specifically the 2018 BioNet and draft 2025 BSP, classifies the proposed site as a Protected Area, as it forms part of the Table Bay Nature Reserve (promulgated in Provincial Notice No. 175, published in Gazette No. 9345, 3 August 1984). The BSP objectives are to maintain the area as a Protected Area. The proposed dredging is a remediation measured intended to address certain impacts of pollution within the lagoon, which would contribute to the maintenance of the Protected Area.

The Estuarine Impact Assessment and the Avifaunal Compliance Statement describe in detail the fauna and their habitats in the lower Diep River Estuary:

The Estuarine Impact Assessment described the modification and domination of the Diep River Estuary by freshwater, and its degradation in water quality, reduced biodiversity, and a near-collapse of native fish populations because of agricultural runoff, effluent from the Potsdam WWTW, and stormwater inputs.

The specialist notes that the estuarine area below the Woodbridge Island bridge is highly disturbed, with the only remaining 'natural vegetation' of environmental significance is the vegetation downstream of the Woodbridge Island comprising a thin strip of dunes between the Woodbridge Island development and the beach itself (Anchor, 2025). This section of dune habitat is to be avoided during dredging, and any dredging-related activities should not impact this area of dune vegetation.

With regard to invertebrate fauna, it notes that there have been significant changes to the benthic macrofauna communities in the Diep River Estuary over time, specifically, a dramatic decline in species richness, and an increase in freshwater species. Species that have increased in abundance include insects (primarily freshwater species). Two alien invertebrates not previously reported from the system have also been introduced. These changes reflect the changing water quality profile of the system.

The Diep River Estuary system (including Rietvlei) is considered an important area for water birds in the region and is recognised as an Important Bird and Biodiversity Area (IBA) by Birdlife International.

While most of the information of bird abundance and species richness for the area is focused on Rietvlei, rather than the lower estuary, various sources have reported kelp gull *Larus dominicanus*, Hartlaub's gull *Chroicocephalus hartlaubii*, common tern *Sterna hirundo* and Cape shoveler *Spatula smithii*, as well as predominantly freshwater species such as red-knobbed coot *Fulica cristata* and African darter *Anhinga rufa*. Site visits undertaken by Anchor in December 2020 and February 2022 confirmed that the estuary is an important feeding and roosting area for many bird species, including greater flamingo *Phoenicopterus roseus*, white-breasted cormorants *Phalacrocorax lucidus* and pied avocets *Recurvirostra avosetta*. The avifaunal compliance statement confirms that, despite at least 14 different bird species potentially being affected by the proposed dredging, the post-mitigation impacts of this project on the local birdlife are likely to be of Low significance if all the mitigation measures recommended in the Estuarine Impact Assessment (Anchor 2025) are implemented.

Estuaries are considered critically important nursey habitat for fish, and the Diep Estuary historically represented some 10% of the nursery area for fish on the West Coast, including species such as the white steenbras *Lithognathus lithognathus*. However, there are clear declines in fish species richness over time. These changes are likely linked to changes in water quality, specifically increased ammonia levels linked to malfunctions in the Potsdam WWTW, as well as substantially reduced dissolved oxygen concentrations, which regularly drop below the 2 mg/l threshold for the survival of aquatic species. While many estuarine-associated species are adapted to hypoxia, an increased

frequency of low oxygen events (anoxia) has almost certainly negatively impacted benthic fish communities.

Dredging is expected to result in short-term disturbance and related impacts to birds and any fish remaining in the lower lagoon. Invertebrates will be impacted more directly, if present in the dredged areas, but are expected to recover from adjacent areas.

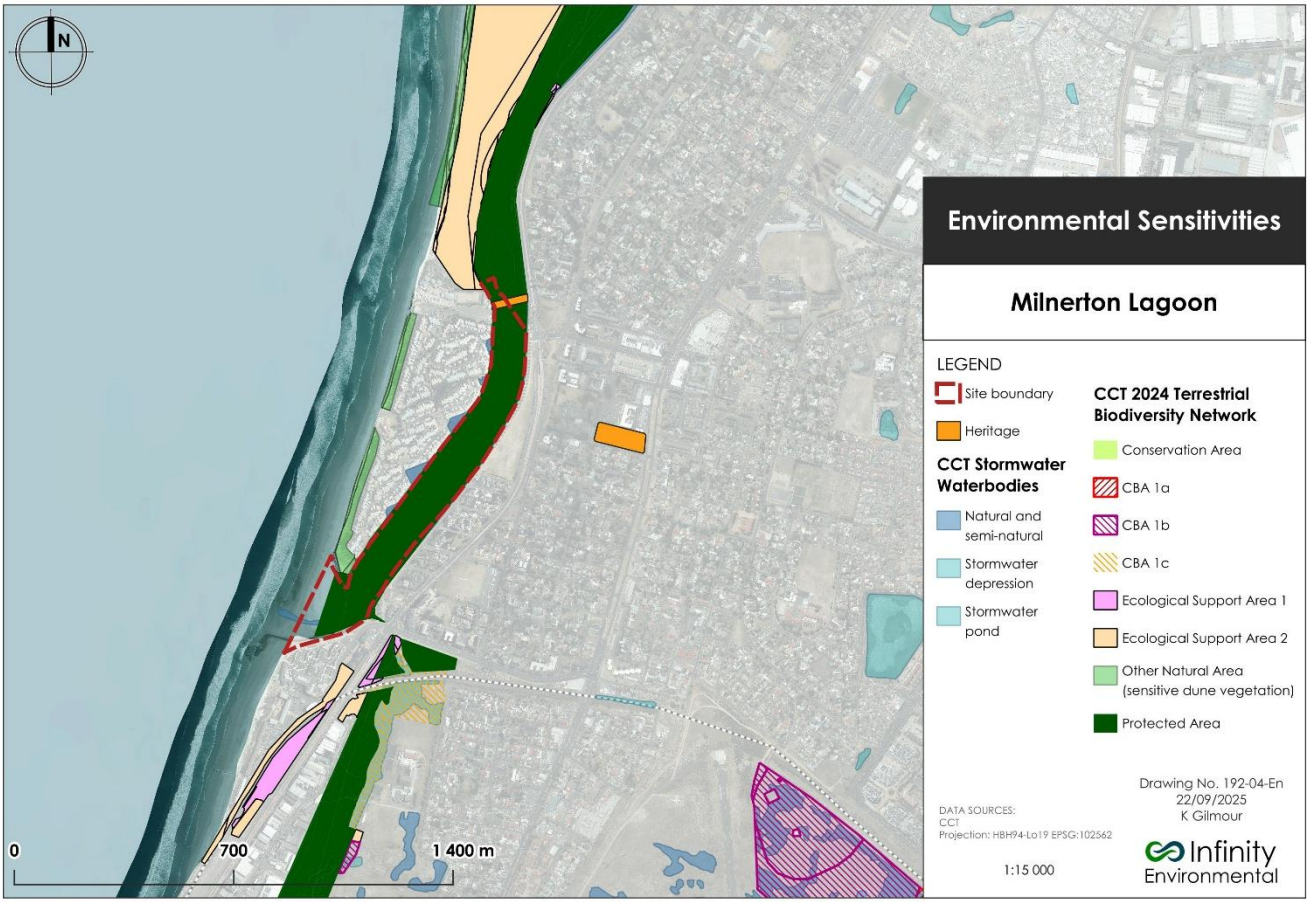

Figure 4: Site boundary of the proposed dredging of the Milnerton Lagoon superimposed on terrestrial and aquatic sensitivities.

1.3 Impacts identified during the Environmental Impact Assessment (EIA)

The impacts and management measures identified by the specialists (see **Table 1.** below) have been incorporated into the EMPr for the project (refer to Appendix G1 and G2 of the BAR) and are included here under to provide context to the impacts assessed for the implementation phase of the Milnerton Lagoon Dredging project.

This MMP applies to the post-dredging phase of the Milnerton Lagoon project, i.e., once the 'implementation phase' of the project is complete. It addresses the ongoing maintenance of the dredged channel to ensure the long-term sustainability of the benefits achieved through the dredging and should provide direction to manage impacts and monitor compliance during the maintenance work.

Table 1: Key Impacts identified during the EIA process.

Specialist study	Impacts identified and assessed (Implementation Phase)
Estuarine Impact Assessment	**Disturbance to and mortality of estuarine communities in the dredge footprint** Direct removal of some 30 000 m³ of estuarine channel sediments during the dredging phase and up to 120 000 m³ during the post-dredging phase, as part of dredge activities will lead to direct mortality of fauna associated with those sediments, namely macrofauna and epifaunal species present within the dredge area. The Milnerton Lagoon benthic macrofauna is very depauperate (i.e., lacking in variety, numbers and/or vitality), with a dramatic decline in species richness over time, and an increase in freshwater species. Of particular concern has been the declines and shifts in behaviour of the burrowing sand prawn, *K. kraussi*, which is an ecosystem engineer. The communities that are present are typical, albeit depauperate, communities that characterise estuaries of the west coast of South Africa. The estuarine specialist confirmed that there are no species of particular conservation concern within the lagoon. While fish are generally considered to be mobile, and will move away from the disturbance, benthic fish species as well as species that are dependent on the estuary for the completion of their life cycle were assessed to be potentially disproportionally affected by the proposed dredging activities. However, it is noted that, in tandem with the declines in macrofauna species, there has been a complete loss of species that depend on these invertebrate communities within the system (benthic goby species in particular), as well as drastic declines in the number of juveniles of linefish species that depend on estuarine habitat (white steenbras and white stumpnose). Therefore, it seems likely that there are very few fish species of sensitivity, conservation concern or commercial importance left in the system that require management. Although the majority of the benthic organisms are likely to die or be removed from the dredged areas, this should not have any repercussions at the population levels as the estuarine specialist affirmed that communities are likely to recover from other sites in the system relatively rapidly after the impact.

Specialist study	Impacts identified and assessed (Implementation Phase)
	Disturbance to estuarine habitat due to dewatering activities The proposed dewatering methodology (should the Design and Layout Alternative 5 be pursued) involves the use of large geotextile "geo-tubes" that will be placed in the grassy recreational space on the eastern side of the estuary body alongside Marine Drive, covering an area of about 0.025 km^2 (see **Figure 3** above). There is no functional estuarine vegetation on site, and the entire eastern bank of the estuary in that area is canalised. This means that the area has ceased to have any connectivity with the estuarine water body (for example, it is no longer inundated with tides and hosts no natural estuarine vegetation). Impacts on estuarine habitat resulting from the proposed dewatering activity is therefore considered to be Insignificant, and no mitigation is required.
	Noise impacts on surrounding estuarine ecology due to dredging activities Noise associated with dredging operations may have an impact on estuarine organisms in the vicinity. Noise generated by dredging activities may include noise associated with service vehicles, vessels, cranes, heavy machinery, generators, etc. Estuarine and marine invertebrates have been shown to be relatively insensitive to low frequency sound, whilst fish appear to be able to tolerate moderate sound levels (Keevin and Hempen, 1997). Waterbirds that use the intertidal flats in the lower estuary for foraging are expected to avoid the sound source should it reach levels sufficient to cause discomfort. The dredge area and area of sand enrichment will overlap with intertidal areas of known importance to avifauna like greater flamingos, white-breasted cormorants and pied avocets. The extent of the impact may extend beyond the local area (i.e., by affecting how migratory species use the system).
	Smothering of estuarine fauna Impacts of smothering related to dredging activities will affect most of the lower reaches of the system. For the Design and Layout Alternative 5, the enrichment of sediment back into the system will result in direct smothering of approximately 51 000 m^2 of lower estuarine habitat. The preferred Design and Layout Alternative 1 is likely to disturb the same area, and potentially even a greater area overall. Smothering occurs when sediments are disturbed and settle on the seabed, covering and potentially suffocating organisms (Wilber et al., 2005). Sediments stirred up by dredging activities can settle over large areas, smothering benthic organisms (Wilber et al., 2005, Pineda et al., 2017). This can lead to decreased oxygen levels in the sediment, suffocating organisms unable to escape or tolerate the changes. The impacts of smothering also have cascading effects on entire ecosystems. For example, changes in the abundance or distribution of key species can alter predator-prey dynamics, trophic interactions, and overall ecosystem function (Wilber et al., 2005). Again however, there is evidence that the benthic habitats of the estuary are depauperate, with significant changes in community composition and

Specialist study	Impacts identified and assessed (Implementation Phase)
	structure. In addition, the estuary is relatively turbid for periods with high flow rates (the wet season, for example), and any communities still present are likely adapted to occasional periods of high sediment load. The permanently open mouth of the system is likely to reduce the intensity of this impact, as is the generally low receptor sensitivity. While the dredging itself will take place over the short-term, and modelling results also indicate almost complete tidal flushing even before dredging during the dry season. Strong freshwater flow (i.e., complete flushing during the wet season), means that resuspended materials are likely to quickly leave the system during this time. Note that no mitigation is possible for smothering linked to the areas of enrichment, and the impact rating remains the same post-mitigation.
	Impacts on estuarine water quality This sedimentation can cloud the water (increased turbidity), reducing water clarity and light penetration and can disrupt the feeding and reproductive behaviours of various species that rely on clear water for survival. This may have negative implications for the primary productivity of microalgae (phytoplankton and microphytobenthos), and for invertebrates and fish. The response of larval fish to turbidity of the water column is generally species-specific (Harris et al., 1999) and estuarine fauna are generally well adapted to high levels of turbidity. However, fine particulate matter may result in the clogging of the feeding and breathing apparatus of certain organisms (e.g., filter feeding invertebrates and the gills of sensitive fish species) (Wenger et al., 2017). Released sediment can also introduce excess nutrients into estuarine waters (Kahn & Mohammad, 2014). Nutrient enrichment can lead to eutrophication, promoting algal blooms and reducing oxygen levels in the water. This can result in fish kills, habitat degradation, and the loss of biodiversity. Elevated nutrient levels associated with finer particle sizes have been reported by Gihwala et al., (2021) in the proposed dredging area. These nutrients will likely therefore be remobilised into the water column during dredging activities. Dredging can also release contaminants trapped in sediments, such as heavy metals, hydrocarbons, and other pollutants, into the water column (Eggleton & Thomas, 2004). These contaminants can have toxic effects on marine fauna, causing physiological stress, reproductive problems, and even death. There are elevated levels of trace metals in the sediments of the system, some of which (As, Cd, Ni, Zn) exceeded the South African and international sediment quality guidelines (Gihwala et al., 2021). Indeed, the average trace metal concentrations for Cd, Ni and Zn within the Diep Estuary were relatively high in comparison to other local and international estuaries (Gihwala et al., 2021). These trace metals will also therefore be remobilised into the water column during dredging activities. It is important to note that just because a trace metal is present within sediment at a specific concentration does not mean that the metal is in a bioavailable (i.e., harmful) form, nor that the concentration in the sediment translates to a 100 % resuspension to a dissolved form. Indeed, it has been suggested by previous sediment transport studies that a small fraction (0.5 %)

Specialist study	Impacts identified and assessed (Implementation Phase)
	of trace metals bound to benthic sediment enters the water column as dissolved trace metals during large scale disturbance of the sediment such as dredging (Van Ballegooyen et al., 2023). Therefore, while resuspension of trace metals into the water column due to dredging is noted, the magnitude of the impact is likely tempered by lower bioavailability. The preferred Design and Layout Alternative 1 will likely have the high intensity, immediate impacts on estuarine water quality through sediment disturbance and remobilisation. For this option, the sediment will essentially be redistributed to create 'intertidal' areas along the eastern edge of the lower system. Any organic matter or other containments present in the sediment will therefore be remobilised within the system, and not physically removed — this will likely result in higher intensity short term impacts on water quality, especially in terms of oxygen levels, given that the dredging cannot be planned for times of optimal flushing (i.e., the wet season). This option does not result in any long-term removal of organic material from the lower estuary. The material that remains on the created intertidal flats will be inundated at high tide, likely resulting on continued 'leeching' of organic material to the water column. The impact is therefore assessed as of a medium-term duration. The Design and Layout Alternative 5 involves a dewatering process, which involves the use of large geotextile "geo-tubes" that contain the material and filter the water as it permeates through the bag. This water will ultimately flow from the geo-tubes and will re-enter the estuary. The volumes of water re-entering the system will be relatively small and will be released over the course of around eight months. It is anticipated that most of the sediments and organic matter present in this dewatering process will be contained within the geo-textile bags. It is also anticipated then that the water re-entering the estuary will be of sufficient quality to not pose a risk to the health of the system in terms of suspended solids and organic material. The impact is therefore assessed as of a short-term duration. There is some risk that sediment disturbance and remobilisation of organic material will have implications for oxygen level in the system. While low oxygen levels do occur within the system (due to organic enrichment), it is important to ensure that additional low oxygen events are suitably managed (and preferably prevented). It is proposed that oxygen monitoring take place in the lower reaches of the system for the duration of the dredging process to monitor these impacts, with control sites upstream of Woodbridge Island. Should the 95th percentile Dissolved Oxygen levels in the lower system fall below 10 % of the control sites, additional management actions may be required (such as oxygenation). The project engineers have stated that dredging cannot be scheduled for the wet season, which is characterised by almost complete tidal flushing, and strong freshwater flow, with complete flushing, during which resuspended materials are likely to quickly leave the system. While the dredging itself will take place over the short-term, modelling results indicate that there is limited tidal exchange with water in the lower estuary (even before dredging) in the dry season. Indeed, there are potential risks that dredging may result in increased deposition of organic material in the

Specialist study	Impacts identified and assessed (Implementation Phase)
	dredge channel in the dry season; however, these are likely to be mitigated by the increased tidal flushing, provided that the mouth stay open.
	Waste generation and disposal The problem of litter entering the environment has escalated dramatically in recent decades, with an ever-increasing proportion of litter consisting of non-biodegradable plastic materials. South Africa has laws against littering, both on land and in the coastal zone, but they are seldom rigorously enforced. Objects that are particularly detrimental to aquatic fauna include plastic bags and bottles, pieces of rope and small plastic particles. Large numbers of aquatic organisms are killed or injured daily by becoming entangled in debris or as a result of the ingestion of small plastic particles (Gregory, 2009; Wright et al., 2013). These materials, being largely plastics, may be transported by currents for long distances out to sea or around the coast. The impact on certain forms of marine life by floating or submerged solid materials cannot be overstressed. Most at risk are seabirds and fish, including possibly rare or even endangered species. Poor management of the dredging and dewatering operations site can also have impacts on water quality. For example, uncontrolled runoff of sewage and other organic wastes is harmful to biota due to high concentrations of nutrients which stimulate primary production that in turn leads to changes in species composition and changes to biodiversity, toxicity effects and impacts on water quality parameters like oxygen (Cloern, 2001). Dredging will also involve the presence of vehicles on the intertidal areas of the estuary. Spills or improper disposal of waste associated with the full project operation on site can lead to water contamination, posing risks to aquatic life and human health. Pollutants can bioaccumulate in the food chain and have long-lasting impacts on ecosystems. To reduce this, all domestic and general waste generated during construction must be disposed of responsibly. All reasonable measures must be implemented to ensure there is no littering and that construction waste is adequately managed. Staff must be regularly reminded about the detrimental impacts of pollution on aquatic species, and suitable handling and disposal protocols must be clearly explained, and sign boarded. The 'reduce, reuse, recycle' policy must be implemented. This impact is rated as Medium without mitigation and is reduced to Very Low with appropriate mitigation actions (for all dredge options).
Avifaunal Compliance Statement	The impacts on birds of the dredging project are likely to include disturbance and degradation of habitat during the construction phase (negative), and ultimately the improvement of habitat in the long-term during operation (positive), as identified in the original estuarine impact assessment. The affected avifauna could include at least 14 regionally and/or globally red-listed species, the most likely and significant of which are Hartlaub's Gull *Chroicephalus hartlaubii*, Cape Cormorant *Phalacrocorax capensis*, Caspian Tern *Hydroporogne caspia*, Great Crested Grebe *Podiceps cristatus*, Grey Plover *Pluvialis squaterola*, Sanderling *Calidris alba*, and

Specialist study	Impacts identified and assessed (Implementation Phase)
	Yellow-billed Duck *Anas undulata*. Three species – African Marsh Harrier *Circus ranivorus*, Great White Pelican *Pelecanus onocrotalus*, and Caspian Tern - are identified as species of conservation concern (SCC) by the Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool. This impact is expected to be of low significance post mitigation according to the avifaunal compliance statement.
Specialist study	**Impacts identified and assessed (Post-dredging Phase)**
Estuarine Impact Assessment	**Impacts of proposed dredging on magnitude of the estuarine tidal prism** Model results for both the low flow and high flow scenarios indicate that the dredging increases tidal exchange between the study area and the ocean. This increased salinity is indicative of tidal flushing — there is more ocean water pushed into the lower system by the tides (in particular, at spring high tide) after dredging. This improvement in tidal flux (as demonstrated by saline inflow) does not appear to increase modelled upstream saline intrusion and any positive impacts appear to be limited to the lower reaches of the system. In the case of this fresher dominated system, increased salinity would ideally result in a more brackish system, which would better support estuarine communities (such as sand prawns). This would also potentially result in potential improvements in water quality, improved habitat for benthic organism and fish, with positive cascading impacts up the food chain. However, based on the modelling results, it is unlikely that the predicted general increase in salinity with dredging will result in a change to the Estuarine Health Score of the system. Instead, model results suggest that dredging will result in marginal improvements in the tidal prism and increased average salinity in the lower reaches of the system. The assessed positive impact is rated as Low positive post-mitigation.
	Impacts of a deeper channel at the mouth on nutrient-enriched fine sediments settlement and flushing The new, narrow dredged channel in the lower reaches of the system may concentrate any nutrient-enriched fine sediments that has been transported down the system, where the enhanced tidal prism will more readily flush it out through the mouth (with the overall larger volume flow rate in dredged area). Note however that this improvement will only likely be realised in the lower portions of the system towards the mouth given that there are limited impacts on tidal prism forcing further upstream. The assessed positive impact is rated as Very Low positive post-mitigation.
	Impacts of new exposed mudflat intertidal areas resulting from sand replacement By depositing the dredged increased sand in intertidal areas, means that more intertidal mud/sandflat area is exposed at low tide in the lower estuary. Assuming that the additional sediment is colonised by benthic macrofauna, this has the potential to expand the feeding area available to waders and other waterbirds that feed on the intertidal mud/sandflats. In addition, the

Specialist study	Impacts identified and assessed (Implementation Phase)
	creation of larger tidal flats adjacent to the dredge area will be exposed at low tide, along with any deposited material. Exposure to air may facilitate bioremediation benefits such as oxygenation of these sediments and exposure to sunlight may have a sterilising effect. The assessed positive impact is rated as Very Low positive post-mitigation.

1.4 Mitigation of impacts

This MMP gives effect to the mitigation measures prescribed in the EIA, particularly for the post-dredging phase. Recommended mitigation measures prescribed by the specialists for the post-dredging phase are set out in **Table 1** below.

Table 2: Key mitigation measures prescribed during the EIA process.

Specialist study	Specialists' mitigation measures
Estuarine Impact Assessment	**Impacts of a deeper channel at the mouth of nutrient-enriched fine sediments settlement and flushing** - The channel must be maintained at this depth. - The mouth must be kept open.

Note: The frequency of mouth management and maintenance of the depth of the scoured channel have specifically been left undefined and rather indicated as proposed for implementation only if sand or sediment accumulates within the lower lagoon and near the mouth to the extent that it restricts tidal flushing and is deemed by the City's Coastal Management and Biodiversity Management Branches to be unlikely to be reopen without intervention.

1.5 Motivation for Maintenance Activities

Whilst the proposed dredging is intended as a once-off remediation measure due to its high cost, it is recommended that the scoured channel depth and the estuary mouth be actively maintained into perpetuity. Relying solely on natural processes to maintain the desired depth of the scoured channel and opening of the mouth is unreliable. Instead, hydraulic management (flow manipulation) options should be considered to enhance inflows and promote sediment movement.

One of the priority management objectives and associated action items and timeframes for the Diep River Estuary presented in the Diep River Estuary Management Plan (2022) is the development of a 'Mouth Management Plan' and accompanying MMP for the manipulation of the estuary mouth in situations where upstream flooding or other circumstances require it (refer to pg. 68 of the Diep River Estuary Management Plan, 2022).

In alignment with this requirement of the 2022 Diep River Estuary Management Plan, this MMP has been developed as part of the Basic Assessment application undertaken to ensure the ongoing maintenance of both the mouth and the depth of the scoured channel for continued function and associated benefit of tidal flushing over time.

1.6 Description of maintenance activities

Maintenance work associated with post-dredging of the lower section of the lagoon is anticipated to include mechanical mouth management (refer to **Figure 4** below) and maintenance of the depth of the scoured channel. Due to the lower bed shear stress within the proposed new dredge channel, there is a risk of organic matter accumulating under low flow conditions. Therefore, the estuary mouth is to be kept open, and the depth of the dredged channel maintained using an excavator or

bulldozer to prevent sediment and organic matter accumulation, which is likely to occur under low flow conditions and if tidal flushing is restricted. Tidal flushing is critical within the lagoon to improve hydrodynamic function of the lagoon, prevent organic sediment build-up and thereby enhance water quality.

The maintenance activities are expected to be restricted to the mouth of the estuary and the section of the lagoon scoured during the implementation phase of the Milnerton Lagoon Dredging project, i.e., from 1.12 km lower section of the lagoon, located within Erf 20315, that extends from the lagoon mouth, south-west of Woodbridge Island, to just north of the Wooden Bridge.

Maintenance will involve the movement of sand/sediment using a bulldozer/excavator to ensure that the mouth is opened when required and the depth of the scoured channel is maintained to 1 m below land levelling datum (LLD).

Figure 5: Milnerton Lagoon mouth maintenance area.

APPROACH AND STRUCTURE

1.7 Content of the MMP

This MMP forms part of the post-dredging phase of the project life cycle.

A decommissioning phase is not included, as there is no infrastructure or activities associated with the dredging that would need to be decommissioned. Once dredging is complete (i.e., the implementation phase of the Milnerton Lagoon Dredging project implementation phase is finished), the post-dredging phase begins and involves maintenance activities as described in this MMP.

The MMP includes the findings and recommendations of the EIA process and specialist studies and/or compliance statements relevant to the post-dredging Phase. The MMP may be amended to include additional information or actions identified during the implementation phases, if applicable. A standardised approach is followed, in which outcomes are set, followed by management actions aimed at achieving the objectives. Management actions are accompanied by monitoring requirements, responsibilities, and targets, where applicable. A tabular format is used for ease of reference (refer to **Section 4.3** below).

1.8 Overarching objective

Maintaining an open estuary mouth is essential to allow tidal exchange, which brings in cleaner, oxygen-rich seawater and flushes out polluted river flows and organic sediments. Without adequate tidal exchange, sediment build-up and reduced oxygen levels create anoxic conditions, leading to foul odours and poor water quality in the lower lagoon. The frequency of mouth management and maintenance of the depth of the scoured channel have specifically been left undefined and rather indicated as proposed for implementation only if sand or sediment accumulates within the lower lagoon and near the mouth to the extent that it restricts tidal flushing and is deemed by the City's Coastal Management and Biodiversity Management Branches to be unlikely to be reopen without intervention.

The terms of reference for this MMP are as follows:

- Describe the site sensitivities based on the specialist assessments (Estuarine and Avifaunal);
- Identify the environmental risks associated with the maintenance management activities; and
- Identify and recommend measures for implementation to avoid or reduce the negative impacts of maintenance activities on the lagoon.

The post-dredging phase of the project involves maintenance activities that involve activities listed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), and the Environmental Impact Assessment (EIA) Regulations of 2014, as amended.

This report has been prepared to meet and support the requirements for MMP approval. The Department of Environmental Affairs and Development Planning (DEA&DP), as the competent authority, is requested to review this document and issue a decision on the adoption of this MMP.

1.9 Scope of the MMP

This MMP is intended to govern the implementation of maintenance activities in and around the lower section of the Milnerton Lagoon with the aim of preventing, minimising and/or mitigating negative impacts and risks. Maintenance activities are, as defined in the EIA Regulations of 2014, as

amended, actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint. This MMP is applicable to the maintenance activities related to the dredging of the lower reaches of Milnerton Lagoon.

The Milnerton Lagoon Dredging project and its associated maintenance activities trigger the following listed activities identified in terms of the NEMA EIA Regulations of 2014, as amended:

Table 3: Listed activities triggered by the Milnerton Lagoon Dredging project.

Listed activity		Activity Description
19A(ii) of Listing Notice 1 (GNR 327 of 2017), as amended	The **infilling or depositing of any material of more than 5 cubic metres into**, or the **dredging, excavation, removal or moving of soil**, **sand,** shells, shell grit, pebbles or rock **of more than 5 cubic metres from –** **an estuary**.	The activities considered in this Maintenance Management Plan (MMP) concern the maintenance of the dredged channel depth and an open estuary mouth during the post-dredging phase. These maintenance activities involve the dredging and moving of up to 120 000 m^3 in future maintenance to maintain a scour channel and open estuary mouth in accordance with this MMP. The width of the dredged channel will be approximately 20 m, with its bottom at 1 m below land levelling datum (LLD) and side slopes with a 1:5 slope. Excavated material is to be placed and spread at 0.5 m above LLD to create flats in the intertidal zone on the sides of the channel. Sandbags may be needed at the site access point(s) - especially at the existing ramp from the main beach parking area - to address natural scouring and improve stability, as soft sand and erosion may hinder site access. Thus, the maintenance activities will result in the infilling, depositing of dredged material into, and the dredging of more than 5 m^3 from, the lower section of the Milnerton Lagoon, which forms part of the Diep River Estuary, as part of maintenance or repeated dredging efforts in the future.

1.10

1.11 Authors of the MMP

This MMP has been compiled by the Environmental Assessment Practitioner (EAP) based on best practice environmental management requirements. Details of the EAP who prepared the MMP are as follows:

Table 4: Authors of this MMP.

Authors	Qualification	Professional registrations	Years of experience	Relevant expertise
Jeremy Rose	B.Sc. (Hons) Environmental and Geographical Science	Registered E.A.P. 2019/1116 Member of IAIAsa	12+	More than 50 EIAs or EMPrs
Kelly Gilmour	M.Sc. Biological Sciences	Candidate E.A.P 2024/8037 Member of IAIAsa	2	3+ EIAs or EMPrs
Tayla Hobson	M.Sc. Environment, Society and Sustainability	Reg. E.A.P. 2019/1018	3+	20 + EIAs or EMPrs

Jeremy Rose has 12 years' experience in the field of environmental management and impact assessment and has managed multiple EIAs and Basic Assessments in South Africa. He holds an Honours degree in Environmental and Geographical Science and is an Environmental Assessment Practitioner duly registered with the Environmental Assessment Practitioners Association of South Africa. Tayla Hobson is also a Registered EAP, and Kelly Gilmour is a Candidate EAP.

1.12 Legal status

This MMP forms part of, and should be read in conjunction with, the EMPr compiled for the Basic Assessment processes. The MMP is a working document for the maintenance of the depth of the scoured channel and the management of an open estuary mouth, which does not itself require EA since the Basic Assessment process, if granted for the Milnerton Lagoon Dredging project, has assessed the impacts for the post-dredging phase of the project and included a review of all applicable and triggered listed activities.

The MMP may also be defined or adopted by the competent authority in terms of the NEMA EIA Regulations of 2014, as amended. Any other applicable statutory requirement must also be complied with, including any obligations under the National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008), as amended (NEM: ICMA).

1.13 Maintenance Management Principles

Effective management maintenance activities reduce their potential impacts. All such activities should be directed by a well-structured MMP, guided by the principles outlined in the DEA&DP's Information Document for the Development of a Maintenance Management Plan (March, 2017). This document highlights the need to assess the level of risk to the receiving environment, identify appropriate mitigation measures, and categorise maintenance activities into four classes (A–D), for which the maintenance of the depth of the scoured channel and the management of an open estuary mouth fall within *Category D: Rehabilitation and restoration activities for maintaining ecological infrastructure*.

1.14 Public Participation

The BAR compiled for the Milnerton Lagoon Dredging project, includes this MMP as an appendix for public review and comment, and has been distributed in terms of Regulation 41 of the EIA Regulations of 2014, as amended, as follows:

- An initial database of potential I&APs was compiled. The database included known adjacent landowners, ward councillors, municipal officials, relevant state departments and organs of state.
- Post, email, and/or telephonic methods were used to reach the adjacent landowners and/or occupiers.
- A notice was placed in a weekly local-circulating newspaper (the *Tabletalk*) on Wednesday, 05 November 2025.
- A1-sized site notices were placed on the site boundaries by the EAP, complying with the relevant regulatory requirements.
- The Draft BAR was made available for download at **www.infinityenv.co.za/public/milnertondredging**.
- A hard copy of the DBAR and its appendices was made available in the Milnerton Public Open Library from Thursday, 06 November 2025.
- Members of the public were also invited to the Public Open House, which took place on 19 November 2025 at the Italian Club of Cape Town (see **Appendix F9** for proof).
- Comments have been accepted via a website form, by email, or via text messaging and addressed in the Public Participation Report (see **Appendix F9** for reference).
- All comments received during the commenting period have been included and addressed under **Appendix F9** of the Final BAR, and submitted to the competent authority for decision-making.

Confirmation and proof of compliance with the PPP requirements is provided under **Appendix F** of the Final BAR, including all supporting documentation and stakeholder engagement records, on submission of the Final BAR for decision-making.

PROJECT ROLES AND STRUCTURE

The general roles to be defined are those of the:

- Authorisation Holder;
- Contractor (Principal Contractor / Project Manager).; and
- Estuarine Specialist / Ecologist.

The specific titles referred to may vary, but the intent of this section is to broadly define expectations and responsibilities for key role players in the implementation of the MMP.

1.15 Authorisation Holder

The **Authorisation Holder** (or its successor in title) will be responsible for the maintenance work. The Authorisation Holder will also ensure, as a signatory to the MMP, that the Contractors fulfil their obligations in terms of this MMP. The Authorisation Holder will adhere to the conditions of this MMP and ensure that all its Contractors, Sub-contractors, employees, suppliers, agents and so forth, for whom it is fully responsible, are aware of this MMP, its requirements and consequences for non-compliance(s) as laid out in **Section 5** below.

The Authorisation Holder is fully responsible for implementing the MMP. The Authorisation Holder will ensure that works on site are conducted in an environmentally responsible manner and in accordance with the requirements of this MMP.

Key responsibilities include ensuring that:

- The Contractor and/or Sub-contractor (or similar) is provided with the necessary information to adequately undertake their responsibilities;
- This MMP is included in the contractual agreements with all Contractors and Sub-contractors;
- Method Statements requested of the Contractor and/or Sub-contractor are provided timeously;
- Corrective action is implemented where required; and
- Appropriate records and information regarding compliance with the MMP requirements are maintained and made available to the Authorisation Holder and/or Competent Authority if requested.

1.16 Contractor

The role of the Contractor is as follows:

- The Contractor shall ensure that all employees, Contractors and Sub-contractors are made aware of the MP and their responsibilities outlined in this document.
- Prior to commencement, the Contractor must meet on site with the Authorisation Holder representative (and/or the Estuarine Specialist / Ecologist who compiled the Estuarine Impact Assessment) to confirm designated development and no-go areas and to confirm the method statements required.
- Liaise with the Authorisation Holder (or representative) and ensure that works on site are conducted in an environmentally sensitive manner in accordance with this MMP.
- Maintain a copy of this MMP and all EAs, management plans and licenses pertinent to the maintenance work on site.
- Ensure that all appointed Contractors and Sub-contractors repair, at their own cost, any environmental damage because of a contravention of the specifications contained in this MMP, to the satisfaction of the Authorisation Holder.
- Ensure that all employees (permanent and temporary) and all Sub-contractors that work on the site for longer than two days, receive environmental awareness training within one week of being on site.

- Designate an Environmental Officer (or employ a designated suitably qualified individual to fulfil the role of an Environmental Officer) to monitor and report on the daily activities on-site during the maintenance work period. The Contractor and individual Sub-contractors may designate Environmental Officers to liaise with the Authorisation Holder (or their representative) on environmental matters.

1.17 Environmental Assessment Practitioner/ Estuarine Specialist/ Ecologist

The EAP/ Estuarine Specialist/ Ecologist is responsible for advising the Contractor, Sub-contractor, and/or Authorisation Holder on the appropriate demarcation of the site for maintenance activities, with particular emphasis on identifying and avoiding sensitive habitats.

This guidance should be obtained during the demarcation phase, prior to the commencement of maintenance activities, and may also be sought on an ad-hoc basis if uncertainties arise during implementation.

It must be noted, however, that the Estuarine Specialist / Ecologist is not formally contracted to provide this service. Guidance will therefore be provided only when time permits and, in most cases, telephonically, to direct the Contractor, Sub-contractor, and/or Authorisation Holder on the appropriate working footprint for the site.

MAINTENANCE MANAGEMENT PLAN

The maintenance work must be conducted in accordance with the provisions outlined below.

1.18 Environmental awareness

Before work is conducted in accordance with this MMP, persons who will be conducting the work must undergo environmental awareness training as outlined in Section 6 of the EMPr and attached to this MMP as **Annexure A**. Attention should be focused on the following areas of sensitivity:

- Beach and sandflat habitat disturbance;
- Soil erosion and sedimentation; and
- Water quality degradation due to siltation and debris.

1.19 General best management practices

The following general management best practices should be implemented where required during the maintenance management activities:

1.19.1 Site boundaries and no-go areas

The Contractor responsible for the post-dredging activities must demarcate the boundaries of the site or area designated for maintenance prior to mouth management and dredged channel depth maintenance. The area demarcated for the maintenance activities should be minimised in extent, as far as possible.

The demarcated maintenance footprint and other sensitive areas to be avoided on site must be undertaken with the guidance of the Authorisation Holder and/or the Estuarine Specialist / Ecologist who compiled the Estuarine Impact Assessment for the project prior to the commencement of any maintenance work on site and must include any dune habitat along the banks of the estuary mouth for avoidance. Access routes to the mouth of the estuary should also be demarcated to ensure avoidance of sensitive dune vegetation. To ensure the public have safe access to public coastal property, in accordance with Section 13 of the ICM Act, designated access points to the beach must be clearly demarcated.

1.19.2 Timing of maintenance works

Mouth management and maintenance of the depth of the scoured channel should be undertaken when sand or sediment accumulates within the lower lagoon (particularly within the 1.12 km lower section of the lagoon, located within Erf 20315, that extends from the lagoon mouth, south-west of Woodbridge Island, to just north of the Wooden Bridge) and near the mouth, restricting tidal flushing. This is most likely to occur during the summer months (dry season) when low flows occur.

1.19.3 Machinery and chemical management

Handling and storage of any pollutants may not take place near or within the lagoon, sea or beach. Instead, machinery must be stored and managed within an area consistent with the area used for the site camp and laydown during the implementation phase of the dredging, and as directed by the Authorisation Holder.

When machinery is used in maintenance works, ensure effective operation of such machinery and equipment with no leaking parts, and refuel at a safe distance from the lagoon and sea to prevent any accidental spillages and pose no threat of pollution.

1.20 Method statements describing proposed maintenance activities

The following sections are Method Statements required of the relevant Contractor and/or Sub-contractor for the types of maintenance activities anticipated to occur in and around the estuary mouth during the maintenance phase of the proposed dredging. It is anticipated that the Authorisation Holder will oversee the works and provide for additional mitigation of specific impacts, should this be required.

1.20.1 Monitoring and inspections of estuary mouth conditions

Description of maintenance activity	Routine monitoring and site inspections of the estuary mouth to confirm whether the estuary mouth is at risk of closure.	
Responsible person(s)	Authorisation holder	
Actions	• Pre-empt potential high-risk mouth closure periods based on desktop analysis of season and weather forecast. For example, mouth closure is more likely under low flow conditions (associated with dry season) and low tide. • Undertake regular visual inspections to ensure that flows out of the lagoon are not blocked by sediment build-up.	
Impacts	Not applicable	
Significance of impacts	Not applicable	Not applicable
Mitigation measures	Not applicable	
Remedial measures	Not applicable	
Time period for maintenance actions	Regular monitoring and identification of potential periods of mouth closure, especially after significant rainfall events to monitor changes in mouth condition and during summer when flows are low. Site inspections should not exceed 2-3 hours.	

1.20.2 Mechanical opening of the estuary mouth

Description of maintenance activity	Mechanical movement of sediment using a bulldozer or excavator to cut a channel connecting the lagoon to the sea.
Responsible person(s)	Authorisation holder
Actions	• Use an excavator or bulldozer to cut a channel in the sand berm at low tide; and • Move sand to the sides of the channel scoured during the implementation phase of the Milnerton Dredging project. Do not place scoured material on the beach.
Impacts	The Estuarine Specialist/ Ecologist assessed the following positive impacts associated with the mouth maintenance activity: • Impacts of proposed dredging on magnitude of the estuarine tidal prism;

<table>
<tr><td></td><td colspan="3">• Impacts of a deeper channel at the mouth on nutrient-enriched fine sediments settlement and flushing ; and
• Impacts of new exposed mudflat intertidal areas resulting from sand replacement.</td></tr>
<tr><td rowspan="2">Significance of impacts</td><td>Impacts of proposed dredging on magnitude of the estuarine tidal prism</td><td>Impacts of a deeper channel at the mouth on nutrient-enriched fine sediments settlement and flushing</td><td>Impacts of new exposed mudflat intertidal areas resulting from sand replacement</td></tr>
<tr><td>Low positive</td><td>Very Low positive</td><td>Very Low positive</td></tr>
<tr><td>Mitigation measures</td><td colspan="3">The impact of the bulldozer or excavator used for maintenance work on any benthic macrofauna and birds is expected to be highly localised and insignificant. Birds are likely to temporarily move away when the bulldozer or excavator is operating, and only a small area of benthic habitat is anticipated to be disturbed when the estuary mouth is reshaped or opened.

This disturbance and limited degradation of ecological and avifaunal habitat will be short-lived and ultimately improve any temporarily disturbed habitat once the maintenance activities are complete. Therefore, the Estuarine Specialist/ Ecologist assessed that there is no feasible mitigation to enhance the direct positive impacts of the mouth maintenance on magnitude of the estuarine tidal prism, nutrient-enriched fine sediments settlement and flushing nor on exposure of mudflat intertidal areas from sand replacement.</td></tr>
<tr><td>Remedial measures</td><td colspan="3">Not applicable</td></tr>
<tr><td>Time period for maintenance actions</td><td colspan="3">The frequency of mouth management and maintenance of the depth of the scoured channel have specifically been left undefined and rather indicated as proposed for implementation only if sand or sediment accumulates within the lower lagoon and near the mouth to the extent that it restricts tidal flushing and is deemed by the City's Coastal Management and Biodiversity Management Branches to be unlikely to be reopen without intervention.</td></tr>
</table>

1.20.3 Monitoring and inspections of the dredged channel conditions

Description of maintenance activity	Routine monitoring and site inspections of the lower lagoon to confirm whether the water quality in the lower lagoon is at risk of increased pollution and odour release due to restricted flushing of the lower lagoon in low flow conditions and consequent accumulation of organic sediment.
Responsible person(s)	Authorisation holder
Actions	• Pre-empt potential high-risk periods based on desktop analysis of season and weather forecast. For example, sediment buildup within

	the lagoon and restricted tidal flushing is more likely under low flow conditions (associated with dry season) and low tide. • Undertake regular visual inspections to ensure that flows out of the lagoon are not blocked by sediment build-up.	
Impacts	Not applicable	
Significance of impacts	Not applicable	Not applicable
Mitigation measures	Not applicable	
Remedial measures	Not applicable	
Time period for maintenance actions	Regular monitoring and identification of potential periods of organic sediment accumulation, especially during summer when flows within the lagoon are low. Site inspections should not exceed 2-3 hours.	

1.20.4 Mechanical opening of the dredged channel conditions

Description of maintenance activity	Mechanical movement of sediment using a bulldozer or excavator to reestablish the depth of the scoured channel (i.e., the channel dredged within the implementation phase of the Milnerton Lagoon Dredging project). The area designated for maintenance of the depth of the scoured channel must be restricted to the 1.12 km lower section of the lagoon, located within Erf 20315, that extends from the lagoon mouth, south-west of Woodbridge Island, to just north of the Wooden Bridge. The channel must be maintained to a depth that is consistent with the channel that was scoured during the implementation phase, i.e., with its bottom at 1 m below land levelling datum (LLD).		
Responsible person(s)	Authorisation holder		
Actions	• Use an excavator or bulldozer to cut the depth of the channel in the sand berm at low tide; and • Move sand to the banks of the scoured channel.		
Impacts	The Estuarine Specialist/ Ecologist assessed the following positive impacts associated with the scoured channel depth maintenance activity: • Impacts of proposed dredging on magnitude of the estuarine tidal prism; • Impacts of a deeper channel at the mouth on nutrient-enriched fine sediments settlement and flushing ; and • Impacts of new exposed mudflat intertidal areas resulting from sand replacement.		
Significance of impacts	**Impacts of proposed dredging on**	**Impacts of a deeper channel at the mouth on**	**Impacts of new exposed mudflat intertidal areas**

	magnitude of the estuarine tidal prism	**nutrient-enriched fine sediments settlement and flushing**	**resulting from sand replacement**
	Low positive	Very Low positive	Very Low positive
Mitigation measures	The impact of the bulldozer or excavator used for maintenance work on any benthic macrofauna and birds is expected to be highly localised and insignificant. Birds are likely to temporarily move away when the bulldozer or excavator is operating, and only a small area of benthic habitat is anticipated to be disturbed when the scoured channel depth is reestablished. This disturbance and limited degradation of ecological and avifaunal habitat will be short-lived and ultimately improve any temporarily disturbed habitat once the maintenance activities are complete. Therefore, the Estuarine Specialist/ Ecologist assessed that there is no feasible mitigation to enhance the direct positive impacts of the scoured depth maintenance on magnitude of the estuarine tidal prism, nutrient-enriched fine sediments settlement and flushing nor on exposure of mudflat intertidal areas from sand replacement.		
Remedial measures	Not applicable		
Time period for maintenance actions	Maintenance of the scoured channel depth should occur whenever the sedimentation restricts tidal flushing and the flow of lower lagoon.		

TOLERANCE FOR NON-COMPLIANCE

The MMP is a legally binding document. Non-compliance with the MMP will result in disciplinary action being taken against the perpetrator/s. Such action may take the form of (but is not limited to) financial penalties, legal action, fines, stop work and rehabilitation at own cost, and/or dismissal.

A variety of legislation dictates behaviour/action associated with environmental management and identifies suitable action in the event of non-compliance. That which is to be considered in the event of non-compliance or contravention of the MMP includes:

- The NEMA (particular section 28 of NEMA regarding the '*duty of care*' principle);
- NEM:ICMA;
- The National Water Act, 1998 (Act No. 36 of 1998), as amended; and
- The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), as amended.

The Contractor and/or Sub-contractor will be deemed to have not complied with the MMP if:

- Within the boundaries of the site there is evidence of contravention of the MMP and its associated and approved Method Statements;
- Environmental damage ensues due to negligence.
- The Contractor fails to comply with corrective or other instructions issued by the Authorisation Holder or DEA&DP (where relevant) within a specified time.
- The Contractor fails to respond adequately to complaints from the public.

The disciplinary action shall be determined according to the nature of the non-compliance or crime, and exact penalties determined by the Authorisation Holder.

If the Contractor is being prosecuted by the DEA&DP or other organ of state in terms of the NEMA or similar act, then the courts will apply penalties in terms of such legislation, taking into account the severity of the incident.

CONCLUSION

The recommendations and mitigation measures outlined in this MMP have been developed to manage the potential environmental impacts of the maintenance activities concerning the lower Milnerton Lagoon dredged channel depth and estuary mouth. Specialist assessment(s) indicate that the impact of the maintenance activities to be conducted during the post-dredging phase is of low-very low positive significance.

By ensuring that Contractors and all parties involved in implementation of the maintenance activities understand and apply the provisions of this MMP, the project can achieve environmental best practice, ensuring that the ongoing maintenance of both the mouth and the depth of the scoured channel support sustainable outcomes for continued hydrodynamic function within the lower lagoon and associated benefit of tidal flushing over time.

This report has been prepared to meet and support the requirements for MMP approval. The DEA&DP, as the competent authority, is requested to review this document and issue a decision on the adoption of this MMP.

BIBLIOGRAPHY

City of Cape Town & Infinity Environmental. (2022). *Diep River Estuarine Management Plan*. City of Cape Town & Infinity Environmental.

Rose, J., Day, L., Basson, G., Clark, B. M., & Winter, K. (2023). *Water Quality Remediation Plan for the Milnerton Lagoon* (No. 19041/1). Infinity Environmental, Liz Day Consulting, Anchor Environmental Consultants, ASP Tech and the University of Cape Town.

ANNEXURE A: ENVIRONMENTAL AWARENESS TRAINING PLAN

ANNEXURE A: ENVIRONMENTAL AWARENESS TRAINING PLAN

This section outlines the training by which the authorisation holder (via its appointed Contractor during the implementation phase) will inform its employees of environmental risks and the manner in which risks must be dealt with to avoid pollution or degradation of the environment during the maintenance phase of the dredging project. It may be adapted as needed to suit the circumstances in which it is implemented.

Course	Required attendees	Presented by	Course content	Timing	Records to be kept
Implementation phase Environmental Awareness Training for manager	• Project Manager appointed by the authorisation holder; • Principal contractor's contract manager, site agents, and assistant site agents (as applicable); and • Contractor's designated environmental officer or Safety, Health and Environment (SHE) representative.	ECO	• Overview of EAs and permits granted; • Basic environmental law; • Roles of the ECO (if appointed), authorisation holder, project manager, and Contractor; • Purpose and content of method statements; • Site sensitivities, including locations and sensitivity of wetland areas and conservation area; • Management actions and measures for the construction phase as detailed in this EMPr; • Record keeping requirements; • Emergency procedures; and • Reporting and compliance monitoring.	Prior to commencement of construction.	• Declaration of adherence to Implementation phase EMPr, signed by Contractor's representative; and • Register of attendance.
Environmental Awareness Training for site personnel	• All site staff and personnel, including temporary staff and visitors to site; and • Maximum of 20 attendees at any one session.	Contractor's designated environmental officer	Environmental do's and don'ts, including: • Access to work areas, location and identification of no-go areas; • Estuarine species and environment; • Damage to or picking of vegetation; • Managing animals found on site; • Smoking and fires;	Before any staff member begins work on site.	• Register of attendance, identifying all attendees by name and ID number, the topics covered, the presenter, and the date and time.

Course	Required attendees	Presented by	Course content	Timing	Records to be kept
			• Storing and handling fuels and oils; • Storing and handling chemicals; • Management of cement, cement bags, slurry, and wash water; • Dust and noise; • Water wastage; • Waste management and litter; • Waste site management; • Ablution facilities; • Plant and machinery maintenance and load management; and • Accident and incident reporting.		