

Morkel's Cottage Pipeline Maintenance Management Plan

City of Cape Town

Submission date: 2024/09/10



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Executive and Operational Summary

Project Overview and Purpose of the MMP

The City of Cape Town (hereafter referred to as CCT, the “Applicant” or “Proponent”) intends to conduct periodic repairs and maintenance work on the 810 mm bulk water pipeline within the Morkel’s Cottage area in Strand, Western Cape Provincial Operations (the “Project” or maintenance work). The bulk (potable) water pipeline traverses several residential areas including Onverwacht, Rusthof, Forbes and Broadlands Village and a conservation area as demarcated by the CCT. The bulk water mains supply potable water to the CCT and connect the water treatment works, dams and other water sources and the CCT’s potable water reticulation system.

The project works would entail the excavation of the pipeline length in stages to caulk (i.e. seal) the joints on the 810mm potable water pipeline.

The proposed repair and maintenance of the bulk water pipeline will trigger activities such as the infilling, depositing, excavation, or moving of more than 10 cubic meters of material within a watercourse. These activities fall within the ambit of a Maintenance Management Plan (MMP). Therefore, it was determined that this project does not require environmental authorisation under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), and the associated Environmental Impact Assessment Regulations, 2014 (EIA Regulations). The reason for this exemption is that the project falls under the category of maintenance activities. Had it been a new activity or an expansion of an existing activity, Listing Notice 1, Activity 19 or 54 of NEMA EIA Regulations, 2014 would have applied, triggering the need for environmental authorisation. However, since the specific project is considered maintenance-related, it is excluded from all listed activities under NEMA EIA Regulations, and a Maintenance Management Plan (this document) must be developed and adopted to allow the necessary maintenance work on site.

Environmental Maintenance Management Plan

Zutari (Pty) Ltd (hereafter referred to as Zutari) was appointed by the CCT to provide professional service i.e., the compilation of an MMP for the proposed periodic maintenance and repairs along the 810mm bulk water pipeline situated at the Morkel’s Cottage area in the Western Cape. The original pipeline is approximately 97 years old and due to floods, erosion, and normal wear and tear it requires periodic maintenance for full functionality. As a pipeline of strategic importance to the City of Cape Town’s integrated Bulk Water supply system, it is imperative to address this issue soonest.

The Morkel’s Cottage bulk water pipeline falls in the G22K quaternary catchment within the Breede-Olifants Water Management Area (WMA). The Breede-Olifants WMA mainly includes the Berg River and Olifants River. This catchment is managed by the Berg-Olifants – Bellville Office in the Western Cape.

The proposed maintenance work will span the Soet River (which has been canalised) and associated floodplain wetlands, therefore, the works trigger Section 21 (c¹) and (i²) ‘water uses’ in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA). Based on the risk assessment results and recommendations from a freshwater specialist the project would require General Authorisation (GA) from the Department of Water and Sanitation (DWS), subject to confirmation. Figure 2 on page 23 provides an overview of the watercourses impacted by the proposed maintenance activities.

¹ “impeding or diverting the flow of water in a watercourse”

² “altering the bed, banks, course or characteristics of a watercourse”

In addition, authorisation would be required from the Department of Environmental Affairs and Development Planning (DEA&DP) for activities listed in terms of the NEMA EIA Regulations (GN. R983, 984, 985 of December 2014).

A segment of the bulk water pipeline for the proposed maintenance and repairs is situated within a conservation area owned by the CCT.

Based on our interpretation of the scope of work and guideline notes of the Information Document for the Development of an MMP for a Watercourse Maintenance, an MMP is required to allow for necessary repairs along the bulk water pipeline and to make provision for long-term maintenance of the bulk water pipeline works near the Morkel's Cottage informal settlement. This report is submitted to fulfil and support the MMP approval requirements. DEA&DP, being the CA, is expected to review and provide a decision regarding the adoption of this MMP.

Party responsible for the implementation of this MMP.

The successful implementation of this MMP is dependent on the following responsible parties adhering to the management measures outlined in Section 7 and Section 8 of this report:

- The Applicant (The City of Cape Town)
- The Contractor
- Subcontractors
- Environmental Control Officer

The proposed maintenance³ activities to the existing pipeline triggers Listed Activities in terms of the NEMA EIA Regulations and approval for such activities must therefore be sought from the Competent Authority i.e., DEA&DP in the Western Cape Province.

The purpose of the MMP is to ensure that the environmental impacts of the proposed maintenance activities are managed, mitigated, and kept to acceptable levels.

This MMP has been compiled with multi-disciplinary inputs from various specialist's inputs including (i) Aquatic Biodiversity and (ii) Terrestrial Biodiversity.

This MMP document stands as a legally binding document to guide all future pipeline maintenance activities pertinent to the Morkel's Cottage Bulk Water Pipeline. The MMP should be updated / amended as appropriate when new interventions are required or whenever a substantial change in the project scope is being made. An internal review of the MMP must take place at least every 5⁴-years to ensure that the most up-to-date and environmentally sustainable best practice methods are being employed to achieve the required objectives.

This MMP is considered a working document which, through monitoring and recommendations made by an Environmental Control Officer (ECO) and, on occasion, the relevant specialist ecologists, must be updated/changed where relevant.

³ Maintenance in the context of this document means routine or emergency actions performed to keep a structure or system functioning or in service in the same location, capacity and footprint.

⁴ Environmental implementation plans and management plans (1) Every national department listed in Schedule 1 as exercising functions which may affect the environment and every provincial department responsible for environmental affairs must prepare an environmental implementation plan within five years of the coming into operation of this Act, and at intervals of not more than five years thereafter (NEMLAA: National Environmental Management Laws Amendment Act, 2022, proclaimed).

The following overarching management principles have been considered for the development and implementation of this MMP:

- (a) The anticipation and prevention of negative impacts and risks, then minimisation, rehabilitation or 'repair', where a sequence of possible mitigation measures to avoid, minimize, rehabilitate and/or remedy negative impacts has explicitly been considered;*
- (b) Avoid and reduce unnecessary maintenance;*
- (c) Maintenance and management of a watercourse have been informed by the condition of the physical and ecological processes that drive and maintain aquatic ecosystems within a catchment, relative to the desired state of the affected system;*
- (d) Management actions aim to prevent further deterioration to the condition of affected watercourses or any adjacent terrestrial habitats and were overall guided by a general commitment to improving and maintaining ecological infrastructure for the delivery of ecosystem services;*
- (e) Managers and organs of state identified, addressed and, where feasible, eliminated the factors that necessitate intrusive, environmentally damaging maintenance; and*
- (f) A process of continuous management improvement will be applied, namely Planning; Implementing; Checking (monitoring, auditing, determining corrective action) and Acting (management review).*

This MMP will be submitted to DEA&DP in electronic format for their records and will be implemented by the proponent after it has been approved by DEA&DP.

Using this Document

Sections 1 – 2 of this MMP provide the background, project description and relevant legislation and policies. Refer to Table 1 for the requirements of an MMP.

Section 3 provides the location and a summary of the present condition of the system and any applicable environmental or heritage context.

Section 4 contains the tasks of the implementation of the MMP.

Section 5 provides the environmental management requirements for the maintenance and repair activities associated with the Morkel's Cottage Bulk Water Pipeline.

Section 6 provides the environmental and reporting requirements.

Table 1 Requirements of the MMP

Requirement	Section
The name of the person/proponent who will undertake the maintenance activity (contact person, address, telephone and fax number and e-mail address).	Section 1: Table 3
Details of the EAP who prepared the MMP; and the expertise of the EAP to prepare an MMP, including a curriculum vitae.	Section 1: Table 4
A description of the objectives of the MMP.	Section 1.2
A description of the relevant legislation and policies within which the MMP is prepared.	Chapter 2
A description of the site and a locality map.	Section 1.3 and Chapter 3
A description of the tasks that will be performed (method statement).	Section 1.3.2 Chapter 5 and Appendix E
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.	Chapter 3 and Chapter 5
Any specialist inputs that were obtained.	Chapter 3, Chapter 5 And Appendices B and C
The roles and responsibilities of the role players who will be involved in the maintenance activity.	Chapter 4

Input for this MMP has been received from the following specialists:

Field	Specialist	Company
Freshwater	Dana Grobler	BlueScience
Botanical	Nick Helme	Nick Helme Botanical Surveys

	Morkel's Cottage MMP
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EMERGENCY CONTACT LIST

	Emergency Response	10111
	Police (SAPS) Strand	021 854 9100/9106
	Ambulance – Metro, ER24	10177 (Metro) / 084 124 (ER24)
	Helderberg Government Hospital	021 850 4700
	Strand Private Hospital	086 133 5566
	Poison Information Helpline of the Western Cape (PIHWC) (Snake Bites)	0861 555 777
	Fire Department	021 444 7600 (Strand)
	Western Cape Disaster Management	021 937 6301
	Cape Town Municipality Switchboard	0860 103 089
	Cape Town Municipality Emergency	021 487 700
	Department of Environmental Affairs and Development Planning (DEA&DP)	021 483 2707
	Biodiversity Management Branch: Owen Wittridge	084 528 0401

Abbreviations

APP	Approved Professional Person
BA	Basic Assessment
BMB	Biodiversity Management Branch
CBA	Critical Biodiversity Area
CCT	City of Cape Town
DEA&DP	Department of Environmental Affairs and Development Planning
DWS	Department of Water & Sanitation
EAP	Environmental Assessment Practitioner
EIS	Ecological Importance and Sensitivity
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ESA	Ecological Support Areas
DFFE	Department of Forestry, Fisheries, and the Environment
GA	General Authorisation
GN	Government Notice
MAP	Mean Annual Precipitation
MMP	Maintenance Management Plan
NEMA	National Environmental Management Act (No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEMLAA	National Environmental Management Laws Amendment Act (No. 02 of 2022)
NFA	National Forest Act
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act
OHSA	Occupational Health and Safety Act (No. 85 of 1998)
PES	Present Ecological State
PPP	Public Participation Process
SE	Site Engineer
WDF	Waste Disposal Facility
WULA	Water Use Licence Authorisation

Definition of Terms

Activity means an activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the Act as a listed activity or specified activity. Activity in this document refers to the activities as listed in Listing Notices 1, 2 and 3 of the EIA Regulations.

Contractor in the context of this document refers to the external contractor responsible for undertaking maintenance activities included within the scope of this MMP. The Contractor is responsible for ensuring the day-to-day implementation of the MMP during the lifecycle of the site activities and is therefore must be well-versed in the contents of this document.

Contractors yard in the context of this document refers to the location and layout of any onsite offices, ablutions, storage containers, fuel storage areas and protection bunds, material lay-down areas, hazardous chemical storage facilities, workshops and plant service and maintenance areas, oil separators and grease traps, first aid facilities, training facilities, central waste storage areas, haul routes and any other facilities associated with the Contractor's yard (as may be applicable).

DEA&DP means Department of Environmental Affairs and Development Planning which are the Provincial Authority in the Western Cape responsible for the administration of matters relating to the environment.

Diverting as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i)GN 4167 of 8 December 2023 (GN 4167, means to, in any manner, cause the instream flow of water to be rerouted temporarily or permanently.

Disciplinary action in the context of this document refers to financial penalties, time penalties, legal action, dismissal and/or any other action taken against the culprit responsible for an incident of non-compliance with the MMP. The disciplinary action will be determined according to the nature of the non-compliance or crime.

DWS or Department of Water and Sanitation.

Environmental audit and monitoring refer to the structured observation, measurement and evaluation of environmental data over time to assess the efficiency of environmental mitigation and rehabilitation measures. The auditing and monitoring of the site will commence at intervals as determined in this document and will include a site inspection of the maintenance activities. A report of the findings at each compliance visit will be compiled and submitted to the Proponent and/or the Department of Environmental Affairs and Development Planning as necessary.

ECO or Environmental Control Officer in the context of this document refers to the party responsible for the environmental compliance and auditing activities required by the MMP for the lifecycle of the maintenance activities. The ECO is to understand the detailed environmental issues associated with the project and is to be well-versed in the contents of the MMP and its associated reports.

Environmental incident refers to an accident or unexpected occurrence related to the project, including discharge of effluent, sediment, or water containing cement or fuel etc, into a watercourse, fire, spills, pollution events, explosions, major emissions, flood events, or bank collapse leading to or potentially negative environmental impacts.

EIRF or Environmental Incident Report File refers to a file provided for the recording of all environmental incidents and includes a complaint register for the recording of public concerns.

Flood event is an event where land is inundated by the overflowing of water from a river channel and where this event causes significant damage to infrastructure or results in watercourse erosion and/or sediment deposition. Note that flooding can be a natural phenomenon in many river or wetland systems

which, due to encroachment and human modification of the form and function of the affected system, may have evolved into a potential hazard to life or property.

Flow-altering as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) GN 4167 of 8 December 2023 (GN 4167) means to, in any manner, alter the instream flow route, speed or quantity of water temporarily or permanently.

General Authorisation (GA) in terms of Section 39 of the NWA

Heritage resource refers to any place or object of heritage significance i.e., of archaeological, palaeontological, cultural, aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Impeding as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) GN 4167 of 8 December 2023 (GN 4167) means to, in any manner, hinder or obstruct the instream flow of water temporarily or permanently, but excludes the damming of flow to cause storage of water.

Indigenous vegetation refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

Invasive vegetation refers to an undesirable alien or indigenous plant growth which shall include, but not be limited to, all declared Category 1 & 2 listed alien invader species as set out in regulations pursuant to the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA). Other vegetation deemed to be invasive shall be those plant species that show the potential to occupy in number any area within the site area, and which are declared to be undesirable and are generally habitat transformers, germinating rapidly in response to disturbances and capable of out-competing desired indigenous species.

Linear activity means an activity that is arranged in or extending along one or more properties, and which affects the environment or any aspect of the environment along the course of the activity, and includes railways, roads, canals, channels, funiculars, pipelines, conveyor belts, cableways, power lines, fences, runways, aircraft landing strips, firebreaks and telecommunication lines.

Maintenance in the context of this document means the necessary repairs, and routine or emergency actions performed to keep a bulk water pipeline infrastructure functioning or in service in the same location, capacity and footprint.

Maintenance Management Plan means a management plan for maintenance purposes defined or adopted by the competent authority.

Method Statement is a written submission by the Contractor [or Party responsible (i.e. CCT) for undertaking the maintenance activity], to the Engineer (or Party responsible for approving the method statement) in response to the specification or a request by the Engineer, setting out the plant, materials, labour, timeframe and method the Contractor proposes using to carry out an activity, identified by the relevant Specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications. The Method Statement must provide the following details: construction procedures, materials and equipment to be used, transportation of equipment/materials to and from site, movement of equipment/material on site, storage of materials on site, containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur, timing and location of activities, areas of noncompliance with the Specifications, and any other information deemed necessary by the Engineer.

NEMA or National Environmental Management Act (No. 107 of 1998).

Pollution in the context of this document refers to the contamination of air, water, soil or environment by a foreign substance or matter.

Proponent City of Cape Town

Reconstruction in the context of this document includes but is not limited to, the reinstatement, repair or replacement of a structure or infrastructure that was damaged or lost to a flood event and may include alterations to the original design to improve the structure's resilience to future high flow events.

SANS or South African National Standards

Scarifying refers to the roughening of the surface of soil as a preparation for re-vegetation.

Spoil material originating from the reconstruction or maintenance operations, and which cannot be reused.

Stretch a section of a watercourse, delineated between two or more mapped coordinates, within which proposed maintenance activities are to take place as guided by an MMP.

Topsoil is defined as a horizon of the soil profile and refers to the upper layer of soil from which plants obtain their nutrients.

Watercourse means:

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

any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and

a reference to a watercourse includes, where relevant, its bed and banks

Waste is defined in the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). There are two main types of waste as follows:

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

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

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

Wetland means, land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

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1 INTRODUCTION

1.1 Background and Strategic Overview

The CCT intends to conduct repairs and periodic maintenance work on the 810 mm bulk (potable) water pipeline within the Morkel's Cottage area in Strand, Western Cape. Please refer to Figure 1 for the locality of the proposed maintenance activities. To reduce frequent leak repairs on the bulk water pipeline, the Bulk Water Management Branch has proposed to repair joints the along length of the bulk water pipeline. The project works would entail the excavation and openings along the pipeline length in stages to caulk the joints on the 810mm pipeline.

While the project involves regulated activities such as the infilling, depositing, excavation, removal or moving of more than 10 cubic meters of material, within a watercourse, it was determined that the project does not trigger the need for environmental authorisation in terms of NEMA EIA Regulations, 2014 as this is regarded as a maintenance activity which can be undertaken under the auspices of an Maintenance Management Plan (MMP).

To ensure that the maintenance work on the bulk water pipeline is in line with NEMA EIA Regulations, 2014, this MMP has been compiled with reference to the Information Document for the Development of a Maintenance Management Plan developed by the DEA&DP (March 2017).

1.2 Maintenance Management Principles

The effective management of repair/ maintenance activities minimises the potential impacts caused by such activities. All maintenance activities should be guided by a well-conceptualized MMP that has principles identified by the Information Document for the Development of a Maintenance Management Plan developed by the DEA&DP (March 2017).

The Information Document for the Development of an MMP (March 2017) explains an important principle of Maintenance Management which must be considered for the required maintenance. This document describes the level of impact assessment needed to quantify and understand the risk the project would have on the receiving environment. Importantly, mitigation measures must be identified to address potential impacts emanating from the activities.

Table 2 below describes the four categories (A, B, C and D) that maintenance can be broadly classified into according to the Information Document for the Development of a Maintenance Management Plan (March 2017).

Table 2: Categories of maintenance

Maintenance Category	Types of maintenance activities (examples only)
Category A: Sediment removal because of deposition or sediment deposition as a result of erosion	• Clearing sediment or placing sediment at: ○ Pump hole/trench ○ Return flow (irrigation) ○ Off-take weir ○ Stormwater outfall ○ Detention/retention ponds ○ Canalized urban rivers ○ Bridges, culverts and drifts • Prevent the formation of islands in the channel of the river • Dredging of in-stream dams

Category B: Emergency repairs – urgent action required to manage risk and damage to assets	• Repair to erosion of riverbank or servicing infrastructure (e.g. pipelines/roads) • Removal of material built up because of flooding/sedimentation and increasing risk to infrastructure • Address damage or replacement of infrastructure (e.g. bridge, pipeline, pump house) • Manage the condition of flood protection berms, and existing structures such as gabions, canalized and stormwater systems • Installing temporary gravel approaches at flood-damaged river crossings
Category C: Managing alien invasive and bush encroachment plant species	• Clearing of alien invasive vegetation out of a watercourse to reduce maintenance requirements as they relate to erosion and sedimentation • Management of indigenous species categorized as bush encroachment, to improve hydrological flow and reduce associated flooding impacts
Category D: Rehabilitation and restoration activities for maintaining ecological infrastructure	• Development and maintenance of ecological buffering systems to improve and/or restore functioning (e.g. wetlands and stormwater detention ponds) • Actively rehabilitating riparian zones through the planting of locally indigenous species • Bank grading and movement/removal of berms and barriers to flow

The proposed repair/maintenance work applicable to this MMP falls within Categories A and B.

Departmental Sub-Region(s) in which the maintenance is to be undertaken:

Table 3 Departmental Sub-Region

REGION 1 (City of Cape Town Metropolitan and West Coast District) ☒	REGION 2 (Cape Winelands District, Overberg District) ☐	REGION 3 (Eden & Central Karoo Districts) ☐
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Details of the person / proponent who will undertake the maintenance activities:

Table 4 Details of the Proponent

Proponent	
Contact person:	Ismail Waryawa: Senior Superintendent: Bulk Services, (City of Cape Town)
Telephone number:	T: 021 444 7980
Email address:	Ismail.Waryawa@capetown.gov.za
Physical address	Steenbras Water Treatment Plant, Off Faure Marine Drive, Gordon's Bay
Postal address:	Steenbras Water Treatment Plant, Off Faure Marine Drive, Gordon's Bay

Details of the Environmental Assessment Practitioner (EAP) responsible for the preparation of the MMP:

Table 5 below provides details of the independent EAPs undertaking the MMP on behalf of the CCT. The amended 2014 EIA Regulations under NEMA, provide general requirements for EAPs and specialists to reduce the potential for bias in the environmental process. The first requirement is that the EAP should be independent (Regulation 13(1)(a) of GN R982, as amended).

Zutari is not a subsidiary of the CCT. The EAP has provided a declaration of independence, and this has been appended to the MMP application form.

Table 5 Details of the EAP

Senior Environmental Assessment Practitioner (EAP)	
Contact person:	Patrick Killick
Telephone number:	044 805 5432
Facsimile number:	044 873 5843
Email address:	Patrick.Killick@zutari.com
Postal address:	P.O. Box 509, George, 6530
EAP Qualifications	MPhil. Environmental Management
EAP registrations/Associations	EAPASA Reg No 2021/4095

Junior Environmental Assessment Practitioner (EAP)	
Contact person:	Silindile Sibiya
Telephone number:	044 805 5424
Facsimile number:	044 873 5843
Email address:	Silindile.Sibiya@zutari.com
Postal address:	P.O. Box 509, George, 6530
EAP Qualifications	BSc Hons. Environmental Science
EAP registrations/Associations	EAPASA Reg No 2021/3651

Name of the landowner(s) on whose behalf the plan has been developed:

Table 6 Details of Landowner

Landowner – Details	
Farm name(s), erf(s) and portion number(s) etc:	Erf 11424 (C06700230001142400000) RE/5822 (C06700230000582200000) Erf 34477 (C06700230003447700000) Erf 11112 (C06700230001111200000) Erf 34482 (C06700230003448200000) RE/4556 (C06700230000455600000) RE/5079 (C06700230000507900000) RE/23014 (C06700230002301400000)
Magisterial District or Town:	Western Cape: City of Cape Town
Name(s) of watercourse(s) in question:	Soet River Canal
Contact person:	Please refer to Appendix B of application form
Telephone number:	Please refer to Appendix B of application form
Email address:	Please refer to Appendix B of application form
Postal address:	Please refer to Appendix B of application form

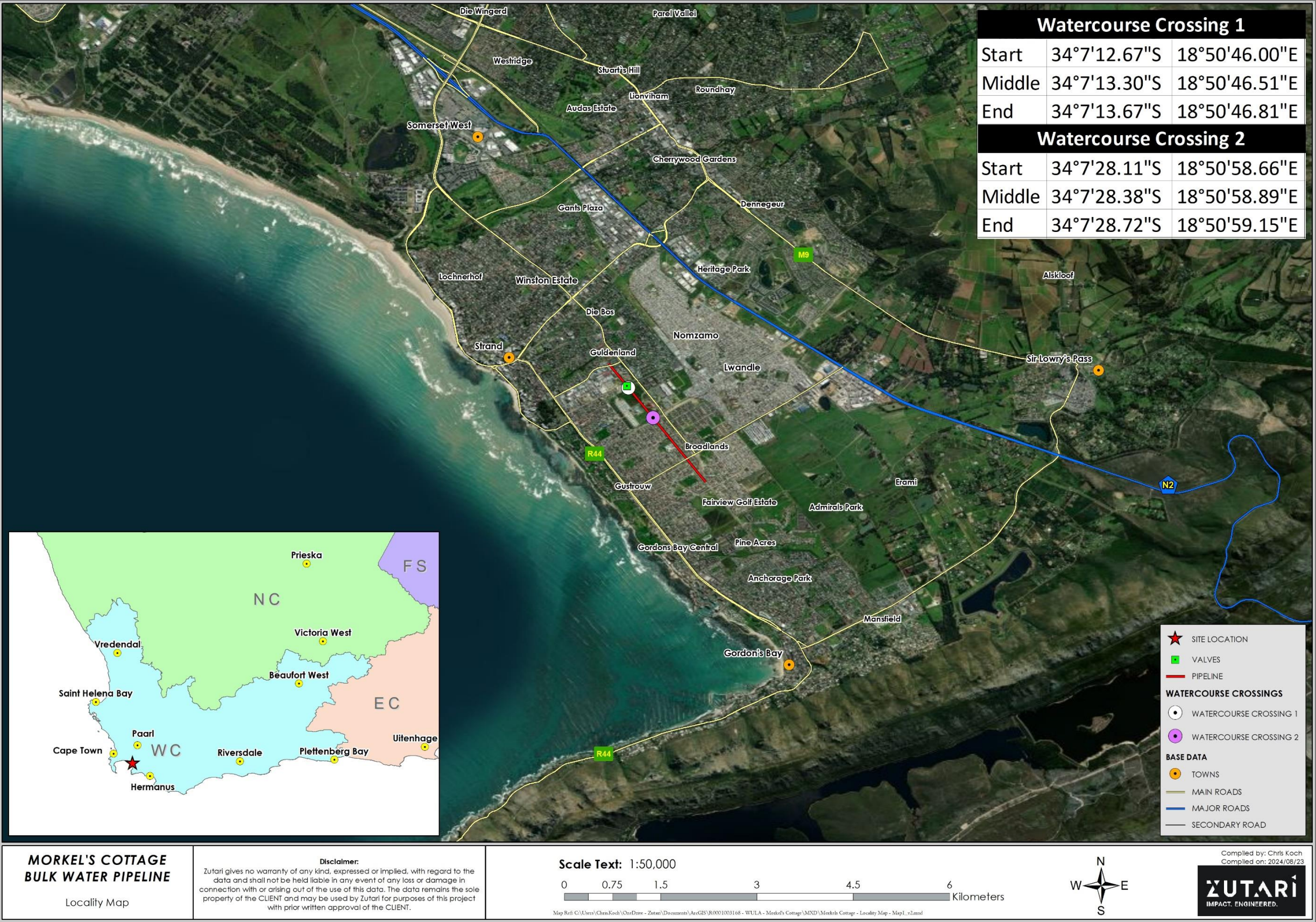


Figure 1: Locality Map (Zutari, 2023)

1.3 Objective of the MMP

The purpose of the MMP is to maintain both man-made and ecological infrastructure in a manner that improves the current state of, and/or reduces the negative impacts on the affected watercourses to ensure that ecosystem services are preserved/improved and to prevent further deterioration of the watercourses.

The objective of this MMP is to formulate measures, which will:

1. Mitigate adverse impacts on various environmental components;
2. Protect environmental resources where possible and prevent further deterioration to the condition of affected watercourses;
3. Enhance the value of environmental components where possible;
4. Avoid and reduce unnecessary maintenance; and
5. Meet the requirements of both the DEA&DP as the competent authority in terms of the NEMA EIA Regulations, as well as the requirements of the Department of Water and Sanitation.

1.4 Project Description and Location

Morkel's Cottage is an informal settlement located in Strand within the CCT boundaries (refer to **Figure 1** above). The bulk potable water pipeline traverses the following residential areas, Onverwacht, Rusthof, Forbes and Broadlands Village and a conservation area demarcated by the City of Cape Town. Northeast of the site is the Lwandle/Nomzamo township. The site falls within the Berg-Olifants Water Management Area (WMA), G22K Quaternary catchment (Figure 2 below).

The infrastructure includes:

- A bulk water pipeline over the Soet River Canal; and
- Scour valves along the pipeline.

1.4.1 Equipment

Equipment to be used for maintenance and repair may comprise of:

- 10-ton tipper truck; and
- Excavator,

1.4.2 Method for Planned Maintenance Activities:

Replacement of damaged pipeline infrastructure:

In most instances, after large storm events there is some degree of damage, including erosion of banks. Some flood debris could also cause damage to the pipeline infrastructure itself which would need to be repaired or replaced if damaged extensively. This could entail dredging, excavating and infilling in the Soet River Canal.

Repair of pipeline infrastructure:

Over time some damage/leaks could occur to the installed pipeline infrastructure, which would result in machinery needing to access the pipe over the floodplain or Soet River canal and would entail dredging, excavating and potentially infilling inside a watercourse. More than 300 square metres of indigenous vegetation could be cleared for maintenance of below ground linear infrastructure (e.g. pipelines) where the linear infrastructure would need to be excavated to provide access for repair work.

Topsoil layer will be removed and temporarily stored in a demarcated area within the Conservation Areas. Topsoil and the blocks of vegetation shall be replaced over the affected area as part of rehabilitation.

Clearing of alien invasive vegetation from watercourses:

Smaller alien invasive plants will be removed by hand using hand tools to remove the roots from the beds and banks of watercourses. All plant material will be removed and disposed of at a licenced waste disposal facility (WDF), with proof thereof retained.

Clearing of indigenous vegetation around the bulk water pipeline in case of repair and maintenance activities:

More than 300 square metres of indigenous vegetation could be cleared during repair or maintenance activities needed at the Morkel's Cottage Bulk Water Pipeline.

Replacement of erosion control measures:

Where erosion control measures are already installed, maintenance would have to be done to ensure these remain in good working order or that areas that become prone to erosion are secured to protect infrastructure and prevent downstream impacts to the aquatic ecosystems. This would entail the potential excavation and infilling of material within watercourses or wetlands and activities such as gabion basket installations.

Clearing of silt or flood debris from infrastructure and watercourses:

Over time silt and gravel will accumulate along, under, downstream and behind infrastructure and in rivers and wetlands. In particular, sediment from roads and surrounding erosion is deposited in rivers and wetlands, especially after heavy or prolonged rainfall. These need to be cleared regularly to ensure the proper functioning of the infrastructure and ecosystems and prevent flooding and associated damage within these areas.

1.4.3 Bulk water pipeline servitude areas

The bulk water pipeline has a 12-meter-wide servitude area as proposed by the CCT Biodiversity Management Branch (BMB). The working area will be marked out using droppers and temporary construction fencing to serve as a visual defining barrier. All work requirements including the movement of personnel, vehicles and machinery will be restricted to the demarcated area.

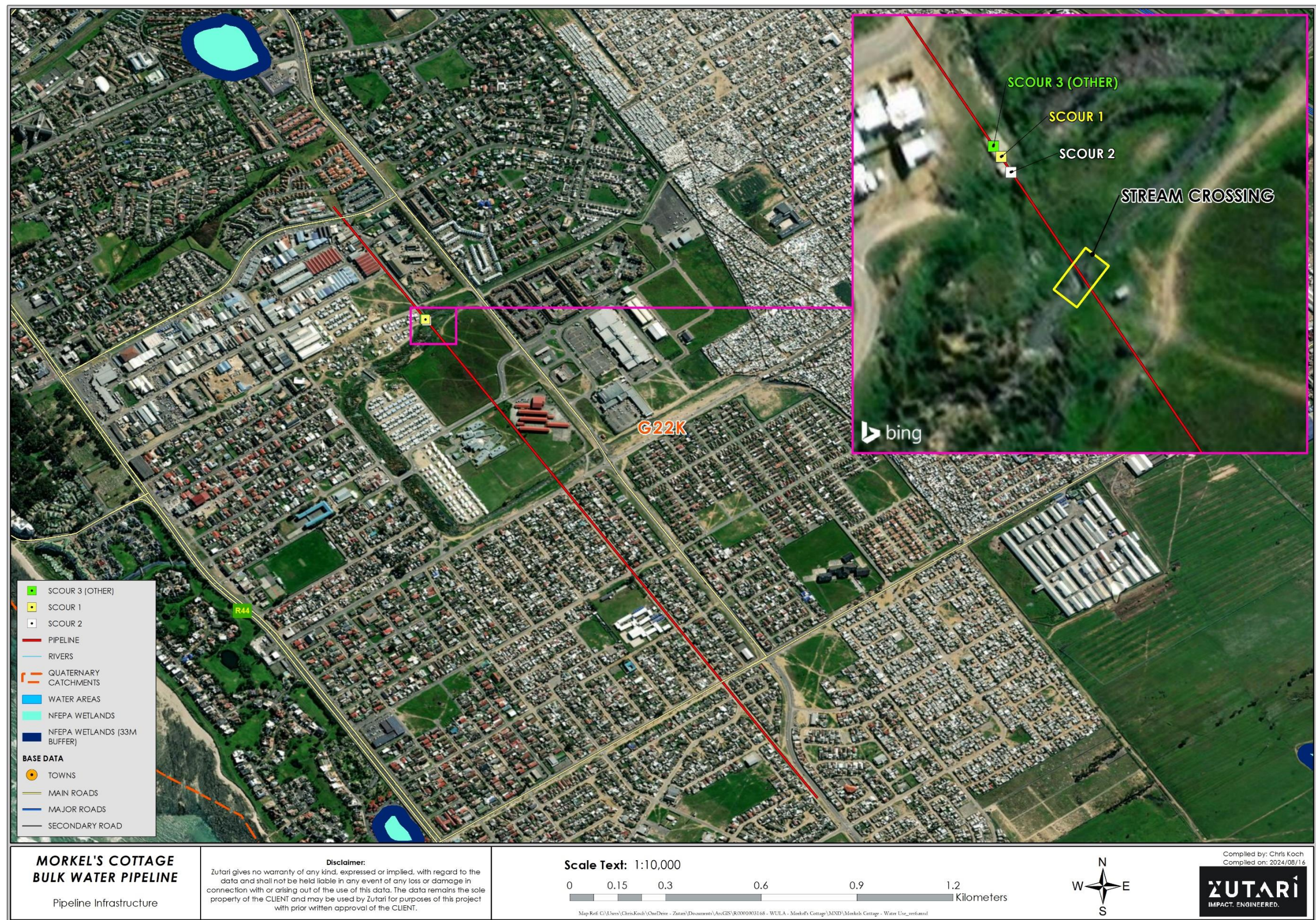


Figure 2: Layout of the Morkel's Cottage pipeline and associated infrastructure.

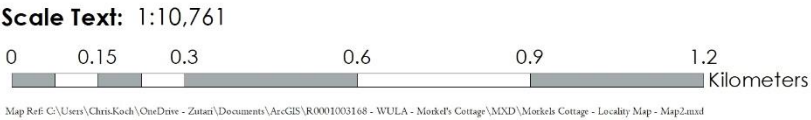


Label	Y	X
A1	34°7'1.019"S	18°50'36.445"E
A2	34°7'3.707"S	18°50'38.645"E
A3	34°7'6.395"S	18°50'40.845"E
A4	34°7'9.084"S	18°50'43.046"E
A5	34°7'11.772"S	18°50'45.246"E
A6	34°7'14.457"S	18°50'47.451"E
A7	34°7'17.143"S	18°50'49.656"E
A8	34°7'19.829"S	18°50'51.861"E
A9	34°7'22.515"S	18°50'54.066"E
A10	34°7'25.2"S	18°50'56.271"E
A11	34°7'27.886"S	18°50'58.476"E
A12	34°7'30.572"S	18°51'0.681"E
A13	34°7'33.258"S	18°51'2.885"E
A14	34°7'35.948"S	18°51'5.083"E
A15	34°7'38.638"S	18°51'7.28"E
A16	34°7'41.328"S	18°51'9.478"E
A17	34°7'44.018"S	18°51'11.676"E
A18	34°7'46.708"S	18°51'13.874"E
A19	34°7'49.398"S	18°51'16.072"E
A20	34°7'52.088"S	18°51'18.27"E
A21	34°7'54.778"S	18°51'20.467"E
A22	34°7'57.461"S	18°51'22.678"E
A23	34°8'0.142"S	18°51'24.89"E
A24	34°8'0.925"S	18°51'25.537"E

- 100M PIPELINE INTERVALS
- SPECIALIST DATA**
 - SOET RIVER CANAL
 - FLOODPLAIN WETLANDS
 - FLOODPLAIN WETLANDS (500M BUFFER)
- BASE DATA**
 - TOWNS
 - MAIN ROADS
 - MAJOR ROADS
 - SECONDARY ROAD
 - VALVES
 - PIPELINE
 - Erf (Intersecting)

**MORKEL'S COTTAGE
BULK WATER PIPELINE**
Locality Map

Disclaimer:
Zutari gives no warranty of any kind, expressed or implied, with regard to the data and shall not be held liable in any event of any loss or damage in connection with or arising out of the use of this data. The data remains the sole property of the CLIENT and may be used by Zutari for purposes of this project with prior written approval of the CLIENT.



Compiled by: Chris Koch
Compiled on: 2024/08/16

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2 RELEVANT LEGISLATION AND POLICIES

This MMP is relevant to the repair and maintenance of the bulk water pipeline located within the terrestrial and aquatic ecosystem in Morkel's Cottage in the Western Cape. This MMP is a working document for, amongst others, the following activities:

- The repair of existing structures, **where work does not require Environmental Authorisation (EA)** in terms of the National Environmental Management Act, No. 107 of 1998 (NEMA) **if undertaken in accordance with an approved MMP.**
- The routine and emergency *maintenance* activities associated with repairing and replacing the bulk water pipeline and pipe crossings **where work does not require Environmental Authorisation (EA)** in terms of the NEMA **if undertaken in accordance with an approved MMP.**

2.1 National Environmental Management Act (Act No. 107 of 1998)

2.1.1 Listed Activities in terms of NEMA

The NEMA provides the framework for environmental decision-making in the country and specifically the EIA Regulations (GN No. R982 in the Government Gazette of 8 December 2014) serve as the instrument through which development decisions are made.

South Africa has rigorous and comprehensive environmental legislation aimed at preventing the degradation of the environment. Section 28(1) of NEMA places a “*duty of care and remediation of environmental damage*” on every person who causes, has caused, or may cause significant environmental degradation. This is a far-reaching obligation, and accordingly, those parties responsible for the degradation of the environment have a legal duty to avoid, minimise or mitigate such impacts.

This has resulted in a set of Listed Activities that can be triggered by developments taking place in sensitive environments, e.g., watercourses. If a development triggers a Listed Activity, it is required to undergo a Scoping and Environmental Impact Report (S&EIR) or Basic Assessment (BA) process in terms of the EIA Regulations (GN R982) to be submitted to the relevant Competent Authority for Environmental Authorisation.

Due to the nature and location of the proposed works, the EIA Regulations (Listing Notice 1, 2 and 3 of December 2014) pursuant to the NEMA were consulted. Table 7 below provides an extract of the Listing Notices and Listed Activities that were considered in the context of the Morkel's Cottage bulk water pipeline repairs/maintenance activities, as proposed by the proponent.

Table 7: Listed Activities (GN No. R. 983 as amended) considered as part of the maintenance work at the Morkel's Cottage Bulk Water Pipeline

Activity No(s):	Basic Assessment Listed Activity(ies) as set out in the EIA Regulations Listing Notice 1 of 2014 (GN No. R. 983 as amended)	Comment Regarding Applicability
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Movement of any material exceeding 10 m ³ within a watercourse requires prior Environmental Authorisation unless the activity/ies are for

Activity No(s):	Basic Assessment Listed Activity(ies) as set out in the EIA Regulations Listing Notice 1 of 2014 (GN No. R. 983 as amended)	Comment Regarding Applicability
	But excluding where such infilling, depositing, dredging, excavation, removal or moving – (b) is for maintenance purposes undertaken in accordance with a maintenance management plan	maintenance purposes in accordance with an MMP. The proposed maintenance work would likely involve infill or deposition of more than 10 cubic meters of material within a watercourse. Adoption of this MMP will allow the activities to be carried out without undertaking a Basic Assessment.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for – (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The clearance of more than 1ha of indigenous vegetation requires prior Environmental Authorisation unless the activity/ies are for maintenance purposes in accordance with an MMP. Clearance of indigenous vegetation within the proposed work area may not exceed 1ha as maintenance will be undertaken in stages. The total footprint of the works area (to be cleared) may not exceed 1ha. Therefore, this activity is not triggered. Adoption of this MMP will allow these activities to be carried out without undertaking a Basic Assessment.

Table 8: Listed Activities (GN No. R. 984 as amended) considered as part of the proposed repair & maintenance work at the Morkel's Cottage Bulk Water Pipeline

Activity No(s):	Basic Assessment Listed Activity(ies) as set out in the EIA Regulations Listing Notice 2 of 2014 (GN No. R. 984 as amended)	Comment Regarding Applicability
24	The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils in anticipation of the extraction or removal of peat or peat soils, but excluding where such extraction or removal is for the rehabilitation of wetlands in accordance with a maintenance management plan.	The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils within a watercourse requires prior Environmental Authorisation unless the activity/ies are for maintenance purposes in accordance with an MMP. Adoption of this MMP will allow these activities to be carried out without undertaking a Basic Assessment.

Table 9: Listed Activities (GN No. R.985 as amended) considered as part of the proposed reconstruction & maintenance work at the Morkel's Cottage Bulk Water Pipeline

Activity No(s):	Basic Assessment Listed Activity(ies) as set out in the EIA Regulations Listing Notice 3 of 2014 (GN No. R. 985 as amended)	Comment Regarding Applicability
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i). Western Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from the high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister. vi.	The proposed maintenance work and repairs would entail the clearance of an area of 300 square metres or more of indigenous vegetation. This listed activity makes specific reference to "except where such clearance of indigenous vegetation requires Environmental Authorisation unless the activity/ies are for maintenance purposes in accordance with an MMP." Adoption of this MMP will allow the proposed activities to be carried out without undertaking a Basic Assessment.

2.2 Public Participation

The Public Participation Process (PPP) for the proposed maintenance of the bulk water pipeline in Morkel's Cottage will include:

- A 30-day comment and response period;
- Stakeholder monitoring committee and ward councillors will be included in the I&AP list;
- The MMP will be available online (Zutari website) for the duration of the PPP comment period;
- An advertisement will be placed in a local newspaper; and
- A site notice will be erected on the fence of the affected property.

All comments received during this period will be recorded and incorporated into the MMP and submitted to the DEA&DP for decision making.

2.3 Other Applicable Environmental Legislation

2.3.1 The National Water Act (Act No. 36 of 1998) (NWA)

The Department of Water & Sanitation (DWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers.

The National Water Act, 1998 (No. 36 of 1998) (NWA) aims to protect water resources, through:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource;
- The rehabilitation of the water resource;

No activity may take place within a watercourse or within the regulated area of a watercourse, unless it is authorised by the DWS. According to Section 21 (c) and (i) of the NWA, a Water Use License (WUL) is required for any activities that impede or divert the flow of water in a watercourse or alter the bed, banks, course or characteristics of a watercourse. The regulated area of a watercourse for section 21(c) or (i) water uses means:

- The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;*
- In the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or*
- A 500 m radius from the delineated boundary (extent) of any wetland or pan.*

In June 2024, BlueScience carried out the DWS Risk Assessment Matrix in terms of the GN 4167 of 2023, and the results of the assessment are summarised in Table 10 below.

Table 10: Summary of the risk assessment for the proposed development

PROJECT:		Morkel's Cottage Strand Pipeline Maintenance Works	
SACNASP Registration Number:		SACNASP 400040/10	
Date of assessment:		2024/06/15	
RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities (version 2.0): SUMMARY			
[ASSUMING THAT ALL PROPOSED IMPACT CONTROL MEASURES (AS STIPULATED IN PROJECT SPECS) ARE EFFECTIVELY IMPLEMENTED]			
Phase	Activity	Impact	Risk Ratings
CONSTRUCTION/REHABILITATION	Excavations and opening along the pipeline length in stages to caulk the joints on the 810mm pipeline	Habitat Disturbance	L
		Water quality impacts	L
	Repairs to valves within the wetland habitats	Habitat Disturbance	L
		Water quality impacts	L
	Other repair and maintenance activities	Habitat Disturbance	L
		Water quality impacts	L

The risk assessment has been undertaken on the basis that all proposed impact control measures are effectively implemented. Based on this assumption, the potential risks of the proposed activities would be low such that the proposed activities would fall within the ambit of the General Authorisation for Section 21(c) and (i) water use activities.

A General Authorisation for the proposed repair/maintenance activities associated with the Morkel's Cottage bulk water pipeline is currently being applied for with DWS. It must be noted that authorisation

is required to permit the periodic maintenance work within watercourse crossings along the entire length of the bulk water pipeline.

2.3.2 The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for the management of all biodiversity within South Africa.

The Act also provides a listing of threatened or protected ecosystems and species in one of the following four categories: critically endangered (CR), endangered (EN), vulnerable (VN), and protected (species only). The four categories are explained below:

- Critically Endangered: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- Vulnerable: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

According to the SA Vegetation map (Mucina & Rutherford, 2018 update), the vegetation units within the Morkel's Cottage pipeline site is a mix of **Cape Flats Sand Fynbos** and **Lourensford Alluvium Fynbos**.

Cape Flats Sand Fynbos is gazetted as a **Critically Endangered** habitat on a national basis (Government of South Africa 2022). The unit has less than 19% of its original total extent still remaining, some 1% is conserved, with a national conservation target of 30% (Rouget *et al* 2004). This vegetation type is species-rich, with a very high number of habitat endemics and rare species.

Lourensford Alluvium Fynbos is also gazetted as a **Critically Endangered** habitat on a national basis (Government of South Africa 2022). The unit has less than 7% of its original total extent still remaining, some 5% is conserved, with a national conservation target of 30% (Rouget *et al* 2004). This vegetation type is species-rich, with few habitat endemics but many rare species.

According to the botanical specialist Nick Helme from Botanical Surveys (2024), there is no remaining vegetation along the route except in the area mapped Critical Biodiversity Area (CBA1) which is highly sensitive. Indigenous plant species diversity is very low throughout the study area, except in the High sensitivity CBA 1 area, where it is medium to high.

2.3.3 National Environmental Management: Protected Areas Act (Act No 57 of 2003) (NEMPAA)

This act provides for the declaration and management of specifically identified areas in South Africa. The Act must be read in conjunction with the NEMBA. The Morkel's Cottage Pipeline is not located within any formally protected areas.

2.3.4 City of Cape Spatial Development Plan (SDP) and Environmental Framework (EMF)

A district SDP and EMF have been developed for the Helderberg District as a framework of policies and plans that will guide the physical development of the district. The objective of the SDP is to retain the rural/natural and unique character of the area by promoting peripheral residential development that may include rural living/ rural lifestyle estates. Recommendations specific to the site are as follows:

- Conserve remnants of sensitive and threatened vegetation types;
- Avoid the development of Critically Endangered vegetation remnants;
- Consolidate and re-enforce the open space “green corridors”, connecting biodiversity remnants where possible;
- Introduce Indigenous landscaping into public open space;
- Establish and maintain appropriate river and wetland buffers and prevent inappropriate land uses in these areas;
- A detailed Environmental Management Programme (EMP) must be drawn up and implemented for all activities approved in these zones, following the City of Cape Town’s specifications for EMPs;
- A stormwater analysis is required to determine the extent and scale of activities that are or are not permitted;
- Clear invasive vegetation within river corridors; and
- Control illegal dumping and littering.

3 SITE CONTEXT

3.1 Site and Existing Infrastructure

Morkel's Cottage is an informal settlement located in Strand within the City of Cape Town Metropolitan in the Western Cape Province (refer to **Error! Reference source not found.** above). The bulk water pipeline traverses the following residential areas, Onverwacht-Rusthof, Forbes and Broadlands Village and a conservation area demarcated by the City of Cape Town. Northeast of the site is the Lwandle/Nomzamo township.

The Morkel's Cottage Conservation Area is located on Erven 32581, 32582 and 34477, Strand. The study area was once part of extensive Lourensford Alluvium Fynbos interspersed with a network of wetlands. Urbanisation and agriculture have replaced almost all of this habitat type, which is now critically endangered. The bulk water line runs through the conservation area and crosses the Soet River Canal and associated floodplain wetlands (Figure 3 and Figure 6 below). To prevent recurrent leaks, the Bulk Water Management Branch proposes to repair and conduct maintenance work on this pipeline. Portions of the bulk water pipeline are located within road reserves along Power Street in Onverwacht and 11th Street in Rusthof.

3.2 Freshwater

3.2.1 Ecoregional Context, Catchment, and Ecological State

The Morkel's Cottage bulk water pipeline falls within the Southern Folded Mountains Ecoregion described by Kleynhans *et al* (2005). This region is characterised by closed hills and mountains moderate and high relief with a high diversity of vegetation types.

On average, the area receives approximately 834mm of rainfall per year. The run-off and the resulting flow within the Sir Lowry's Pass River, as well as the inundation in the floodplain wetlands on the site, is thus higher during winter (June to October). This is an important consideration when planning the proposed maintenance of existing infrastructure which is close to any of the watercourses. By conducting maintenance work during summer (November/December to March/April) the impacts of the construction phase can be greatly reduced.

The floodplain wetland area is considered to be largely modified as a result of direct modifications to habitat as well as the development of the surrounding catchment.

The wetland area as a valley bottom wetland within critically endangered Lourensford Alluvium Fynbos, has moderate ecological importance and sensitivity. Amphibians that are likely to occur within the wetland areas include painted reed frog (*Hyperolius marmoratus*), Raucous toad (*Sclerophrys capensis*), Cape sand frog (*Tomopterna delalandii*), Western rose rain frog *Breviceps rosei* ssp. *Rosei*), Grays stream frog (*Strongylopus grayii*) and Cape River frog (*Amietia fuscigula*). All of the amphibians are listed as being of Least Concern on the International Union for Conservation of Nature (IUCN) Red List.

The floodplain wetlands fall within the quaternary catchment G22K (Sir Lowry's Pass River) where the target ecological category is a C Category (moderately modified). The current condition of the floodplain wetlands is largely modified with a negative trend of deteriorating ecological conditions. Given the surrounding impacts of residential development, the ecological condition of moderately modified will not be achievable but considering the moderate ecological importance and sensitivity of the aquatic habitat type, it would be important to strive to improve the current ecological state where possible.

3.2.2 Aquatic Features

The mapped aquatic feature within the site comprises a floodplain wetland associated with the Soete River. This mapping occurs in the National Wetland Map (version 5) and the City of Cape Town's (CCT) Biodiversity Network wetland mapping. Drainage into the floodplain wetlands is via a constructed stormwater channel while flow exists in the area via a stormwater pipeline. Most of the Soet River is no longer open to the surface but drains with stormwater pipelines and only surfaces near the mouth in the Greenways Golf Estate.

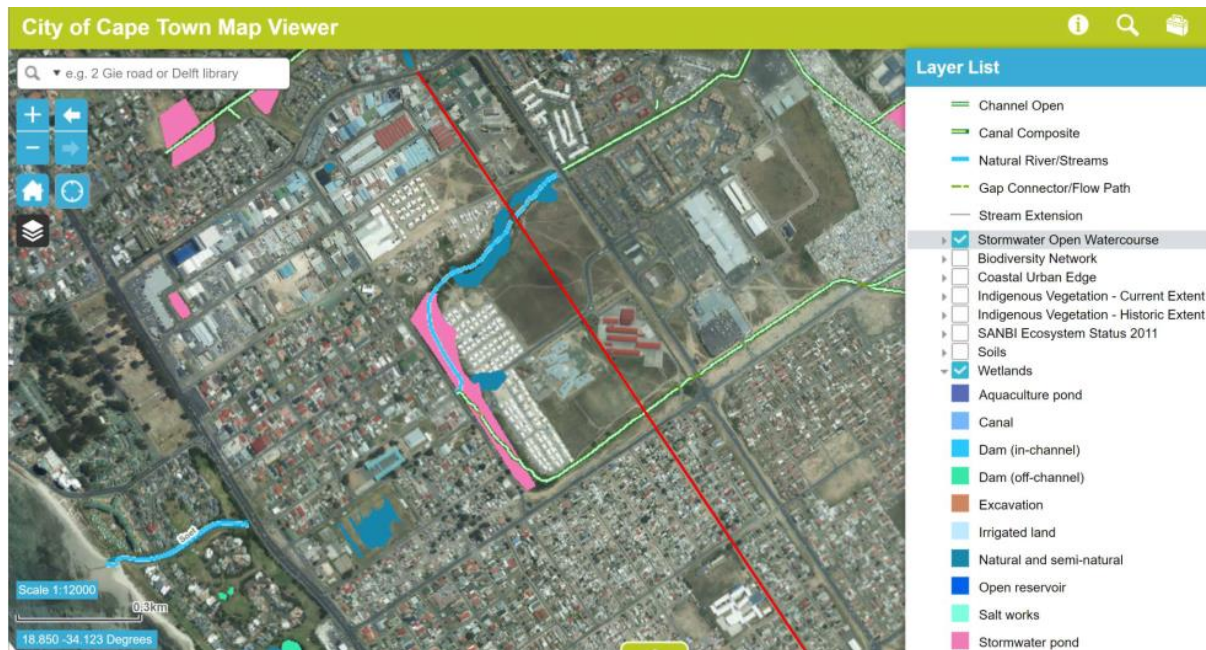


Figure 3: The City of Cape Town's stormwater and wetland mapping in the vicinity of the site (red line) (City of Cape Town Map Viewer, 2024)

3.2.3 Wetland Habitat

The only wetland habitats in the vicinity of the pipeline proposed to be maintained comprise floodplain wetlands associated with the Soet River. These floodplain wetlands are mostly stormwater-fed and receive significant litter from the adjacent developed areas. The dominant wetland vegetation comprises *Phragmites australis*, with patches of *Typha capensis*, typical of stormwater-fed urban wetlands.

Only the seep wetland within the adjacent Harmony Flats Nature Reserve has been assessed as the wetland habitat occurring within the wider area that may be impacted by the proposed.



Figure 4: View of the floodplain wetland at Morkel's Cottage

3.2.4 Present Ecological Status and Ecological Importance Sensitivity

The Present Ecological Status (PES) Method (DWAF 2005) was used to establish the integrity of the wetland in the wider study area and was based on the modified Habitat Integrity approach developed by Kleynhans (DWAF, 1999; Dickens et al, 2003).

The PES was assessed for the watercourses affected by impacts associated with the proposed repair/maintenance activities. The assessment results showed that the floodplain wetland area is considered to have a PES category of D/E or a largely to seriously modified condition as a result of direct modifications to the habitat as well as the development of the surrounding catchment.

The Ecological Importance and Sensitivity (EIS) assessment considered several biotic and habitat determinants surmised to indicate either importance or sensitivity. The floodplain wetlands have a category C (moderately modified).

3.2.4.1 Wetland Services

An assessment of wetland ecosystem services supplied by the floodplain wetlands was conducted according to the guidelines described by Kotze et al (2005). Table 11 below provides a rating on the ecosystem services provided by the floodplain wetlands. The wetland area on the site offers some valued goods and services, particularly in terms of stormwater mitigation.

Table 11: Goods and services assessment results for wetlands (low=0 and high=4)

Goods and services	Floodplain wetland	Goods and services	Floodplain wetland
Flood attenuation	2.5	Biodiversity Maintenance	1.5
Stream flow regulation	1.0	Water supply	0.0
Sediment trapping	1.5	Natural resources	0.0

Goods and services	Floodplain wetland	Goods and services	Floodplain wetland
Phosphate trapping	2.0	Cultivated foods	0.0
Nitrate removal	2.3	Cultural significance	1.0
Toxicant removal	2.0	Tourism and recreation	1.0
Erosion control	1.0	Education and research	1.0
Carbon storage	2.0		

3.2.5 Identified Impacts

The Aquatic Biodiversity Assessment (2024) explains that watercourses and wetlands are highly modified (in a present ecological condition of largely to seriously modified). They are of moderate ecological importance and sensitivity as they still provide valuable habitat for biota and some services in the mitigation of urban stormwater quality and flow.

There will be a direct physical disturbance to the river habitats as a result of the proposed maintenance activities. The operational phase activities (i.e. any future maintenance such as proposed) will involve the same impact on the rivers as the currently proposed activities (construction phase). The impacts associated with the maintenance plan are unlikely to be of any significant threat to the floodplain wetlands and channels of the Soet River adjacent to the pipeline. The potential impacts that could be expected, associated with the proposed maintenance activities are:

- Localised water quality impacts during the maintenance;
- Modified surface and subsurface flows to wetlands; and
- Disturbance of aquatic habitat.

Risk Assessment: The Aquatic Biodiversity Risk Assessment (2024) was undertaken using the Risk Matrix which is specified in the GN 4167 of December 2023 for section 21 (c) and (i) water uses (impeding or diverting flow or changing the bed, banks or characteristics of a watercourse) as defined under the NWA (1998). All of the activities associated with the proposed maintenance works have a low impact significance and Low risk rating.

The result of the risk assessment assumes that all of the recommended mitigation measures will be stringently implemented and monitored appropriately.

PROJECT:

Morkel's Cottage Strand Pipeline Maintenance Works

RISK ASSESSMENT MATRIX for Section 21 (c) and (i) Water Use activities - Version 2.0

Name of Assessor:

Antonia Belcher

Signature:



SACNASP Registration Number:

SACNASP 400040/10

Date:

15-Jun-24

Risk to be scored for all relevant phases of the project (factoring in specified control measures). MUST BE COMPLETED BY SACNASP PROFESSIONAL MEMBER REGISTERED IN AN APPROPRIATE FIELD OF EXPERTISE.

Phase	Activity	Impact	Potentially affected watercourses			Intensity of Impact on Resource Quality					Overall Intensity (max = 10)	Spatial scale (max = 5)	Duration (max = 5)	Severity (max = 20)	Importance rating (max = 5)	Consequence (max = 100)	Likelihood (Probability) of impact	Significance (max = 100)	Risk Rating	Confidence level
			Name/s	PES	Ecological Importance	Abiotic Habitat (Drivers)			Biota (Responses)											
						Hydrology	Water Quality	Geomorph	Vegetation	Fauna										
CONSTRUCTION/REHABILITATION	Excavations and opening along the pipeline length in stages to caulk the joints on the 810mm pipeline	Habitat Disturbance	Soet River wetlands	D/E	Moderate	1	2	1	2	2	4	1	2	7	3	21	80%	16.8	L	High
		Water quality impacts	Soet River wetlands	D/E	Moderate	1	3	1	2	3	6	1	1	8	3	24	80%	19.2	L	High
	Repairs to valves within the wetland habitats	Habitat Disturbance	Soet River wetlands	D/E	Moderate	1	1	1	1	1	2	1	2	5	3	15	60%	9	L	High
		Water quality impacts	Soet River wetlands	D/E	Moderate	1	2	1	1	2	4	1	1	6	3	18	60%	10.8	L	High
	Other repair and maintenance activities	Habitat Disturbance	Soet River wetlands	D/E	Moderate	2	3	2	2	2	6	1	2	9	3	27	60%	16.2	L	High
		Water quality impacts	Soet River wetlands	D/E	Moderate	1	3	1	2	3	6	1	2	9	3	27	60%	16.2	L	High

Figure 5: Risk Matrix summary completed for the proposed maintenance activities

3.3 Vegetation

According to the SA Vegetation map (Mucina & Rutherford, 2018 update), the only remaining vegetation unit in the study area is a mix of **Cape Flats Sand Fynbos** and **Lourensford Alluvium Fynbos**. No copy of this map is included as it adds no real value.

Cape Flats Sand Fynbos is gazetted as a **Critically Endangered** habitat on a national basis (Government of South Africa 2022). The unit has less than 19% of its original total extent remaining, some 1% is conserved, with a national conservation target of 30% (Rouget *et al* 2004). This vegetation type is species rich, with a very high number of habitat endemics and rare species.

Lourensford Alluvium Fynbos is also gazetted as a **Critically Endangered** habitat on a national basis (Government of South Africa 2022). The unit has less than 7% of its original total extent still remaining, some 5% is conserved, with a national conservation target of 30% (Rouget *et al* 2004). This vegetation type is species rich, with few habitat endemics but many rare species.

There is no remaining natural vegetation along the route, except in the area mapped as CBA1 in Figure 6 High sensitivity areas are also restricted to the area mapped as CBA1, which is largely in accordance with the Screening Tool categorisation, which shows Low sensitivity all along the route except in the far west, where it is High.

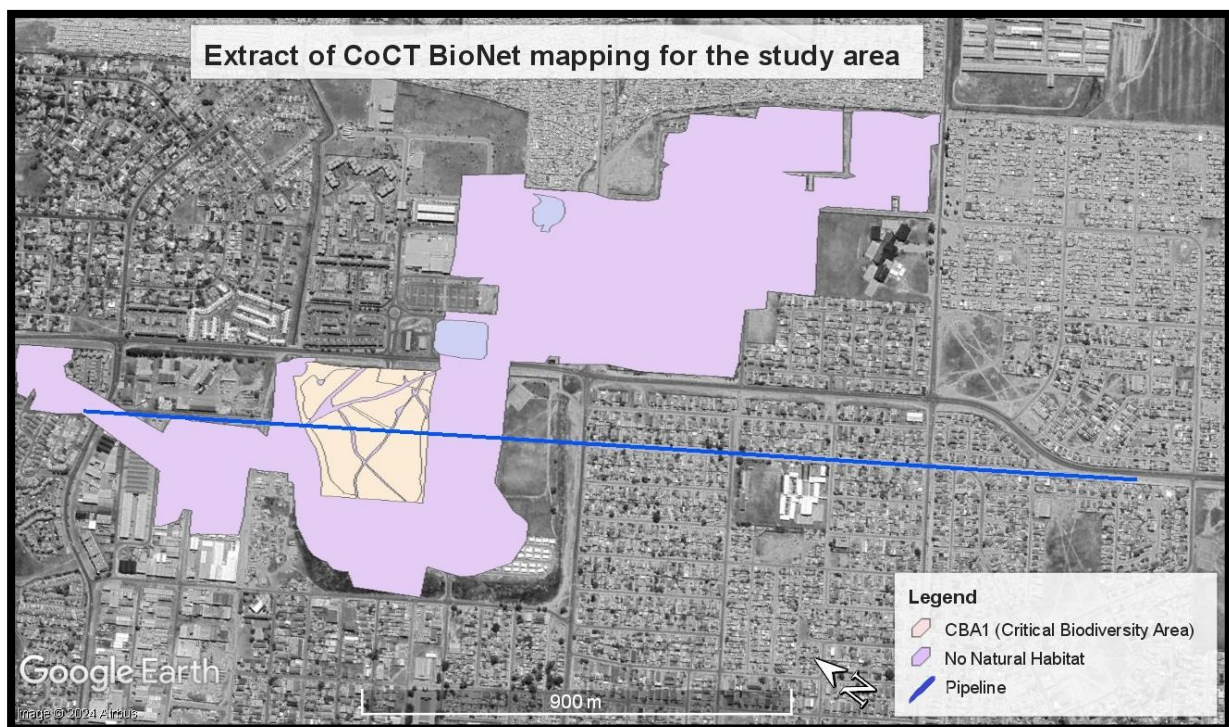


Figure 6: Extract of City of Cape Town Biodiversity Network mapping for the area. This accurately shows that the majority of the study area has no natural habitat, and that there is an important section of CBA 1 (Critical Biodiversity Area level 1; fair condition) mapped west of Strand High School and Morgendal Road. This mapping is supported.

Ten plant Species of Conservation Concern (SoCC) are known to occur in the High sensitivity area (CBA1), as shown in Table 1. This is a significant number for such a small area and highlights the conservation importance of this area. There is a moderate likelihood of one or two other SoCC occurring in this area.

Table 12: List of the plant Species of Conservation Concern (SoCC) that are known to occur in the High sensitivity area (CBA1) along the route.

Species	Redlist Status
<i>Lachenalia corymbosa</i>	Vulnerable
<i>Protea scolymocephala</i>	Vulnerable
<i>Arctotheca forbesiana</i>	Vulnerable
<i>Gladiolus trichonemifolius</i>	Vulnerable
<i>Babiana angustifolia</i>	Near Threatened
<i>Echiostachys incanus</i>	Vulnerable
<i>Lachnaea grandiflora</i>	Vulnerable
<i>Babiana villosula</i>	Near Threatened
<i>Moraea angulata</i>	Critically Endangered
<i>Pauridia alba</i>	Vulnerable

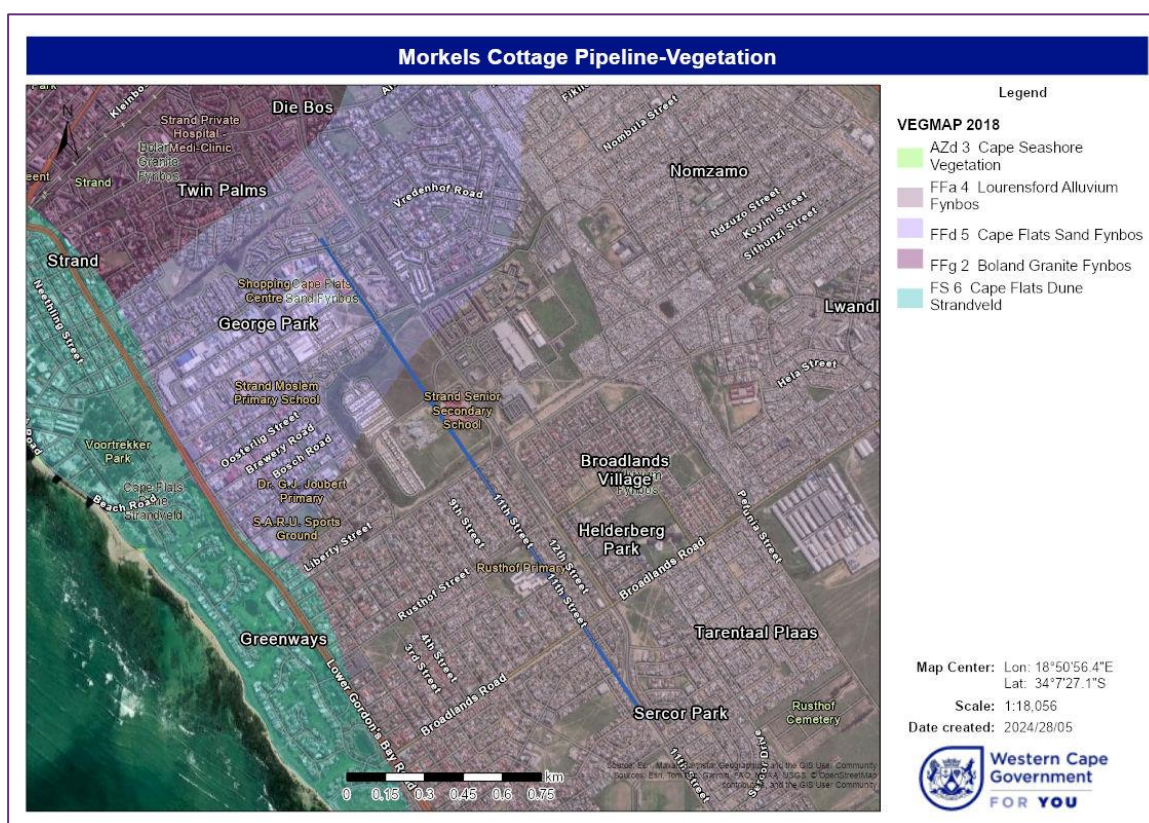


Figure 7: Type of vegetation at Morkel's Cottage

3.3.1 Conservation Context

Biodiversity Areas (CBAs) are required to meet biodiversity targets. These areas have high biodiversity and ecological value and therefore should be kept in a natural state without further loss of habitat or species. Low-impact, biodiversity-sensitive land uses are the only land uses allowed in CBAs.

According to CapeFarmMapper (Accessed July 2024), a portion of an area where the bulk water pipeline traverses is mapped as a Terrestrial CBA and an Aquatic CBA (Figure 8). The Terrestrial CBA is CBA1 (Critical Biodiversity Area level 1, fair condition).

As per the information extracted from a report received from the CCT Biodiversity Management Branch (BMB), The bulk water pipeline traverses the Morkel's Cottage Conservation Area. The Morkel's Cottage Conservation Area is one of two remaining remnants of the Critically endangered vegetation type, Lourensford Alluvium Fynbos. The protected area has over 214 species of which many are featured on the Red Data list. As a result, even the smallest disturbance can have a significantly negative effect on

the survival of threatened species. All maintenance work must be conducted during the dry season as compression and disturbance of wet soils will cause irreparable damage to plant roots, bulbs and seeds. A Method Statement will be required by the Bulk Water Branch for the approval of the BMB.



Figure 8: Bulk water pipeline in relation to CBAs/ESAs

3.4 Heritage, Culture and Palaeontology

Should any heritage resources⁵, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities, all works must be stopped immediately within this area, and Heritage Western Cape must be notified without delay.

Contact details are as follows:

Heritage Western Cape:

T: 021 483 5059

E: hwc.hwc@westerncape.gov.za

⁵ Heritage resource means any place or object of cultural significance

Cultural significance means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

4 IMPLEMENTATION OF THIS DOCUMENT

The MMP is intended for use by the Proponent (the CCT), the Contractor, and the Environmental Control Officer (ECO) responsible for the maintenance activities associated with the Morkel's Cottage bulk water pipeline. This document provides the framework for environmental management, where issues, actions and responsibilities associated with the general activities on the site/s are defined. The site-specific requirements relevant to the site in question, as per the site-specific information of this report, shall be implemented as part of the MMP. The recommendations included in the relevant specialist reports included in **Appendix B** and **Appendix C** must also be followed. The MMP is also to be read in conjunction with the relevant health and safety legislation, plans and guidelines. The general principles contained within the MMP shall apply to the lifecycle of the repair and maintenance activities, and all site activities shall be undertaken in such a manner as to minimise impacts on the biophysical and socio-economic environment.

The MMP is an open-ended document implying that information gained during repair/maintenance activities and/or monitoring of procedures on-site can lead to changes in the MMP, but these changes or inclusions will need to be approved by DEA&DP before they can be implemented.

The following subsections set out the roles, responsibilities and functions of each role player, staff induction training, and the housing of the MMP and associated permits/authorisations. Mitigation measures are provided in Table 14 of which relevant sections must be drawn into the Method Statement (**Appendix E**).

4.1 Method Statements

The Information Document for the Development of an MMP for a Watercourse (March 2017) states that method statements must provide a step-by-step plan to inform the responsible person(s) of the process and actions to take in a sequential and logical manner, which aims to reduce the impact of undertaking the activity within a reasonable timeframe and cost.

A method statement should be compiled for each activity given the likely specific circumstances and conditions of a site requiring maintenance. However, in situations where uniform conditions and circumstances are evident for multiple sites requiring the same type of activity, a method statement can be given for a specific type of activity to be undertaken at multiple sites given the requirements.

The maintenance/repair of the bulk water pipeline includes a servitude works area. The Bulk water line servitude works area includes the Bulk waterline within a 12-meter-wide servitude area. The works area will be marked out using droppers and temporary construction/safety fencing to serve as a visual defining barrier. All work requirements including the movements of persons, essential vehicles and use of machinery will be restricted to this demarcated working area.

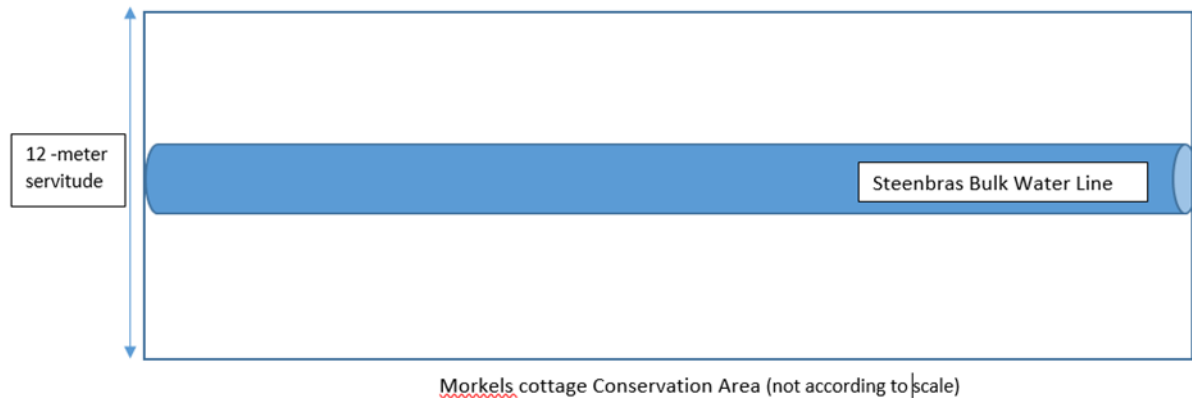


Figure 9: Bulk water pipeline and 12-meter servitude working area

4.2 Method statement for the proposed maintenance activities

The method for the proposed maintenance/repair activities is described in detail below.

4.2.1.1 Remedial work

Should remedial /repairs be required on the Bulk Waterline due to a leak in the pipe this should be done as soon as soon as possible. These unexpected events can occur during any time of the year i.e. winter/summer. It is therefore vital that a Method Statement (MS) is submitted by the Bulk Water Branch and approved by the Biodiversity Management Branch when the remedial works are required on the bulk water line.

An example of a MS for remedial works i.e. leaks: The City of Cape Town - Bulk Water Department needs to effect remedial repairs on the 810mm DN Steel Steenbras Pipeline, location as specified in aerial image (figure2) below.

Method:

- City of Cape Town Bulk water team to demarcate a works area of (12m x 12m = 144 m²) for each leaking joint. Total area = 288 m².
- Bulk water team guided by Biodiversity shall carefully remove vegetated sods, top soil and temporarily store it on a Demarcated area within the Conservation.
- An Excavator Machine shall be on site to open the leak and expose the joint.
- The lower rocky soil shall be removed form site with a 10-ton tipper truck.
- Once the Joint is exposed, the Caulking Team will commence repairs on the joint.
- The welders shall do continuous welding of a Keeper ring to prevent the lead from moving out of the joint over time.
- Back filling will then commence with Philippi sand being compacted to cover the pipe.
- Topsoil and the Blocks of Vegetation shall be replaced over the affected area as part of rehabilitation.

4.2.1.2 Maintenance work

Prior to any maintenance work on the Bulk Waterline a MS would be required by the Bulk Water Branch and approved by the Biodiversity Management Branch.

An example of a MS for maintenance works i.e. joint repairs

The Bulk Water Line runs through the Morkel's Cottage Conservation Area and require maintenance. The maintenance action required on the Morkel's Cottage Bulk water pipeline requires the opening of the line over the joints in the pipeline. An inspection and work hole called a "fox hole" will be excavated at approximately 8-meter intervals to gain access to the pipeline joins and to complete the necessary maintenance.

The absolute maximum workspace allowed is 30 m along the pipeline and 12m across. Disturbance within this space will be kept to an absolute minimum and that the area to the east of the pipeline be narrower only allowing space for a bakkie with associated welding equipment to move up and down the line. There will be no excavation of this area.

The fox holes required to be 3m X 3m wide and 3 m deep. Where possible excavation of such holes will be kept to the 5 expected joining areas of the pipe. Disturbance between the sections between the joins will be kept to a minimum to prevent unnecessary degradation of the area.

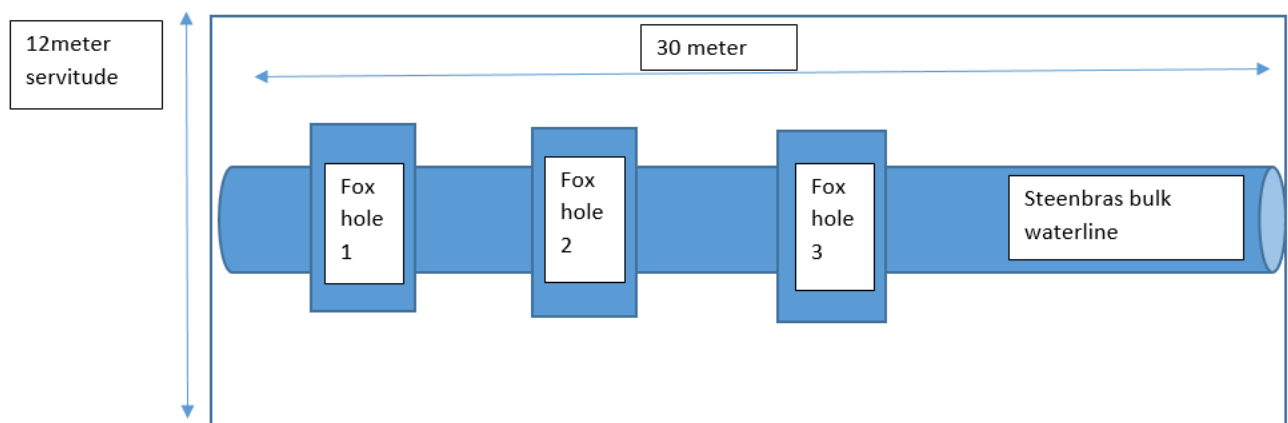


Figure 10: Bulk water pipeline and fox holes

Method:

- Area to be excavated must be demarcated (30 m X 12 m) = 360 m²
- Removal of vegetated sods – in order to facilitate the removal of vegetated sods, the works area must be dampened over a period of two days before vegetated sods can be removed. This is to avoid crumbling of the vegetated sods when being excavated.
- Any material and or vegetated sods stored on site must be stockpiled in areas where the site has already been disturbed i.e. within the access roads.
- An Excavator Machine shall be on site to open the leak and expose the joint.
- The lower rocky soil shall be removed from site with a 10-ton tipper truck.
- Once the Joint is exposed, the caulking team will commence repairs on the joint.

- The welders shall do continuous welding of a Keeper ring to prevent the lead from moving out of the joint over time.
- Back filling will then commence with Philippi sand being compacted to cover the pipe.
- Topsoil and the blocks of vegetation shall be replaced over the affected area as part of rehabilitation.

4.3 Roles and Responsibilities

4.3.1 Names and Details of Role Players

Table 13 below provides details of the role players for the Morkel's Cottage Bulk Water pipeline maintenance activities.

Table 13: Names and details of role players

Proponent: Contact Person: Role: Email: Tel.:	City of Cape Town Ismail Waryawa: (City of Cape Town) Senior Superintendent: Bulk Services Ismail.Waryawa@capetown.gov.za T: 021 444 7980 M: 066 274 9519
Competent Authority: Contact Person: Role: Email: Tel.:	Department of Environmental Affairs and Development Planning To be updated

4.4 Responsibilities and Functions of Role Players

4.4.1 The Proponent

The Proponent (the CCT) is the landowner and is responsible for the management of all assets within their land. In the context of this document, the CCT shall be responsible for the planning and funding of the repair and maintenance activities which will be undertaken by the relevant Contractor, or relevant CCT Branch.

The Proponent shall be responsible for ensuring that other role players fulfil their obligations in terms of the requirements of this MMP:

- The Proponent shall ensure that the Contractor that will undertake the maintenance activities is well versed in the contents of this MMP and in the conditions of the water use authorisation and shall take such measures that are necessary to bind such persons to conditions.
- The Proponent shall appoint a suitably experienced ECO before the commencement of reconstruction or maintenance activities contained herein to ensure compliance with the provisions of the MMP.
- The Proponent shall obtain and comply with all the necessary approvals, permits, authorisations and requirements set by the relevant National and Provincial Departments, and Local Authorities for the reconstruction and maintenance activities before any site preparation activities are undertaken.

- The Proponent shall notify the DEA&DP of the intention to perform activities under the approved MMP.

4.4.2 The Contractor

The Contractor in the context of this document refers to the external contractor or relevant CCT Branch responsible for the repair and maintenance activities. The Contractor shall be responsible for ensuring the day-to-day implementation of the MMP during the lifecycle of the repairs and maintenance activities, and shall be well-versed in the contents of this document:

- The Contractor shall confirm that all the relevant environmental authorisations, permits and/or licenses are in place prior to commencing with any site activities.
 - The conditions of the WUL shall be brought to the attention of all persons (employees, sub-consultants, etc.).
- The Contractor shall liaise closely with the ECO on any environmental management issues, incidents or emergencies.
- The Contractor shall ensure that the works on-site are conducted in an environmentally sensitive manner and in accordance with the requirements of the MMP at all times. Special care shall be taken by the Contractor to prevent irreversible damage to the environment.
- The Contractor shall ensure all work areas, stockpiles and facility locations are located in a manner that complies with the relevant legislation and the requirements of this MMP.
- The Contractor shall ensure that all staff are adequately informed of the requirements of the MMP pertaining to their site role, and that they have attended an environmental induction training session (this session must be in the form of a talk and/or a written code of conduct that is clearly explained to and understood by the team).
- The Contractor shall ensure that any subcontractors or visitors to the site are conversant with the MMP or relevant chapters of the MMP pertaining to their role on-site.
- The Contractor shall conduct activities in a manner that will cause the least possible disturbance to the existing amenities, whether natural or man-made, in accordance with all the currently applicable statutory requirements. Disturbance or disruption of the daily lives of local communities shall be avoided as best as practically possible.
- The method statement for the maintenance/repair activities is attached as **Appendix E**.
- The Contractor shall allow officials from DEA&DP access to the site/s for the purposes of compliance monitoring in terms of the approved MMP.
- The Contractor shall ensure that the site/s is/are rehabilitated and reinstated in accordance with the requirements of this MMP.
- If required, the contractor may establish a site yard at a location agreed on by the relevant CCT Branch.

4.4.3 The Environmental Control Officer (ECO)

The ECO in the context of this document refers to the party responsible for the environmental compliance and auditing activities required by the MMP for the lifecycle of the repair and maintenance activities. The ECO shall be appointed by the Proponent, and the designation shall be reserved for a

suitably qualified (National Diploma/Degree in Natural Science or an equivalent qualification), independent person. The ECO shall have adequate environmental knowledge to understand the detailed environmental issues associated with the maintenance activities, and is to be well versed in the contents of the MMP and its associated reports:

- The ECO shall undertake all inspection, monitoring and auditing tasks associated with the repair and maintenance activities to ensure compliance with the approved MMP, as described in the relevant chapters of this report (and dependent on whether repair or routine maintenance activities are being undertaken).
- The ECO shall liaise closely with the Contractor, and shall provide guidance on any environmental management issues, incidents or emergencies that are brought to their attention.
- The ECO shall review and sign off on the repair and maintenance method statement attached hereto as **Appendix E**.
- The ECO shall assist in providing recommendations for remedial action in the event of any non-compliance.
- The ECO shall liaise with the DEA&DP on all matters requiring such liaison, at the discretion of the ECO.
- The ECO shall ensure compliance with any reporting requirements contained in the department's approval of this MMP.

4.5 Environmental Induction Training

Environmental induction training of site staff will ensure they are aware of the environmental management requirements for the site and behave in an environmentally conscientious manner:

- The Contractor shall ensure that all site workers, plant operators, drivers and anyone under their employ receive the induction training course prior to commencing with any site activities.
 - The induction training material shall address, but not be limited to the Code of Conduct, basic environmental awareness, basic health and safety awareness, prevention of water, soil, and air pollution, prevention of soil erosion and sedimentation, basic principles of materials handling and storage, fire risks, protection of fauna and flora, emergencies and incident responses, spill response provisions, social responsibility, administrative and reporting procedures.
 - Relevant chapters of the MMP shall be presented during this course to facilitate compliance.
 - Proof of completing such training shall be provided to the ECO (attendance register or similar).
 - It is recommended that the environmental awareness and education for staff on site be delivered in more than one language, if necessary, to ensure that everyone fully understands their obligations.
 - Appropriate supervision shall be provided, depending on the scale of the operations.

The performance of site staff, in terms of meeting the environmental requirements of this MMP, shall be monitored on an ongoing basis. Any shortcomings shall be addressed constructively and proactively through appropriate communication and training.

5 ENVIRONMENTAL MANAGEMENT REQUIREMENTS FOR MAINTENANCE AND REPAIR ACTIVITIES ASSOCIATED WITH THE MORKEL'S COTTAGE PIPELINE

Table 14: Method statement that describes immediate proposed tasks, and assessment of their impacts

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
Maintenance and repair in the context of this document means routine or emergency actions performed to keep a structure or system functioning or in service in the same location, capacity, and footprint. The requirements of this Chapter are only relevant to maintenance and repair activities but shall be read in conjunction with Chapters 1 - 3 of the MMP.				
1.1 Communication Procedures				
1.1.1 Initial Maintenance Project Meeting	N/A	N/A	An initial project meeting shall be held between the ECO and the Contractor to: • Ensure all parties have full sets of this MMP and any other documentation or plans required. • Discuss the required repair and maintenance work. • Discuss communication channels including contact details for relevant parties.	The Contractor is required to adopt the method statement provided in this MMP. Should the mitigation measures not be implemented according to this MMP, the Contractor will be liable for the damages caused due to his negligence. The ECO will also advise and/or recommend remedial actions should these mitigation measures not be implemented accordingly. This applies to all actions regarding the maintenance Activities.
1.1.2 ECO Monitoring & Reporting	N/A	N/A	The following communication procedures apply to the responsibilities of the ECO during the maintenance activities: • Once the repair/maintenance of the entire pipeline is concluded for that maintenance period, the ECO shall inspect the work. • The ECO shall compile a general progress report following any repair or emergency maintenance activities, which can be in the form of a checklist and/or diary entries (or similar), but shall include: i) Dated photographic record. ii) A record of any environmental incidents or non-compliances. The compliance	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			chapter of the report shall record the nature of any environmental queries/issues/incidents, the instructions on remedial actions to be undertaken, and the disciplinary actions prescribed. The record shall continue on a monthly basis until such time as the incident has been closed out, and the final record on the matter shall reflect on the remedial actions taken and the dates of eventual compliance by the Contractor. iii) Minutes of any site inspections, or meetings pertaining to the environmental incidents, or of non-compliance with this MMP. The ECO shall submit all reports on the routine maintenance activities to DEA&DP, the Proponent and the Contractor.	
1.1.3 Emergency Reporting & Procedures	Accidental fire Accidental leaks Accidental spillage of pollutants	N/A	The following emergency reporting and procedures will minimise the risk associated with emergency events: - The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with, and reporting emergencies, including accidental fire, which shall include notifying the relevant authorities of the event: i) All site staff shall be briefed regarding the requirements for dealing with potential emergencies including fires, accidental leaks and spillage of pollutants. ii) Education of site staff shall focus not only on the prevention of emergencies but also on proactive and appropriate interventions where such emergencies occur. - The contact details of the nearest hospital, police and ambulance services (Refer to Contact List Page 7 of the MMP) shall be prominently posted at the site for staff whilst undertaking any maintenance work.	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			Emergency equipment including spill kits and fire extinguishers shall accompany staff to the site for the duration of the maintenance activities.	
1.1.4 Method Statements	N/A	N/A	The Contractor shall review, adopt, and sign off on the provided method statement which is attached hereto as Appendix E . Any deviations from the methods described herein shall be submitted to the DEA&DP before the commencement of the activities.	
1.1.5 Record Keeping	N/A	N/A	All records relating to the implementation of this MMP shall be kept together such that they can be retrieved easily. These records shall be made available for scrutiny by any relevant authorities at their request.	
1.1.6 Environmental Awareness	N/A	N/A	The Contractor must ensure that all their employees (including all security staff) are trained on environmental considerations, and contents of this MMP. The contract managers and supervisors will receive an environmental briefing from the ECO, who can also assist with presenting different environmental topics at the toolbox talks. All training and attendance registers must be kept at the site offices. It is recommended that the environmental awareness and education for staff on site be delivered in more than one language, if necessary, to ensure that everyone fully understands their obligations.	
Morkel's Cottage Bulk Water Pipeline Maintenance Measures				
1.2 Pipeline Repair/ Maintenance				
1.2.1 Repair/maintenance of the bulk water pipeline The CCT will need to maintain the bulk water pipeline located at Morkel's Cottage. This will be done routinely or in case of emergencies where there are leaks. This could entail dredging, excavating and infilling in a stream and	<u>Freshwater and Terrestrial Ecology</u> Localised water quality impacts during the maintenance Modified surface and subsurface flows to wetland Disturbance of aquatic habitat	<u>Freshwater</u> Medium <u>Terrestrial Ecology</u> Impacts on terrestrial vegetation are likely to be Low. A 240m long section of the pipeline, west of the Strand Secondary School, is of High ecological sensitivity.	Besides efforts to minimise the working width in sensitive habitats, it is recommended that the following measures are implemented during maintenance and repair activities: - Clearing of vegetation must be minimised. - Work should ideally be undertaken only in the dry season (late October – end March), when many bulbs are dormant, and soils are hard; - No vehicular access, except via the two or three existing tweespoor tracks (dirt road);	Should a plant search and rescue be required, the ECO or appointed sub-contractor shall record the types of species collected as well as the number of specimens collected, the habitat they were removed from and their general condition. After the maintenance works are complete, any areas within the maintenance footprint that have been degraded from their condition before construction and as a result of the

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
clearance of indigenous vegetation.		This area is mapped as a CBA1 and at least 10 plant Species of Conservation Concern are recorded from here. This is the only section of the route of ecological concern, and disturbance in this area must be minimised.	- No dumping of materials, equipment or soil in the high-sensitivity area; - All topsoil to a depth of 40cm must be removed from any areas where excavation will take place in the High sensitivity areas. This must be carefully stored outside the High-sensitivity areas and covered with black plastic to prevent drying out and germination; - Topsoil must be stored for the minimum possible time. This must then be replaced on the surface and gently tamped down whenever work disturbance-related work is completed in this area; - Any specimens of <i>Lachnaea grandiflora</i> and <i>Protea scolymocephala</i> present in the areas to be disturbed must have seeds harvested by a professional fynbos horticulturist prior to disturbance, and these must then be germinated and grown on for later transplanting back onto the site in a suitable area where they are unlikely to be similarly disturbed in the future; - Transplanting should happen two years later, in May. These shrubby species will not survive translocation as adult plants, which is why this extra step mitigation is required for these species, as opposed to all the other SoCC on site, which are geophytes (and should hence survive in topsoil removal and replacement). - Minimise the spatial extent of disturbance and the frequency of, or requirement for, maintenance activities within or within 10m of the delineated wetland areas. The disturbance footprint should be demarcated. No activities should take place outside of this area. - Mix any concrete, other materials or potential contaminants at least 10m away from the	maintenance activities must be restored to their former condition. Disturbed areas should be revegetated with appropriate indigenous plant species. Suggested wetland plants for revegetation of disturbed areas are as follows: More permanently wet areas: <i>Schoenoplectus scirpoides</i>, <i>Bolboschoenus maritimus</i>, <i>Eleocharis limosa</i>; - Wetland margins / seasonally wet areas: <i>Salix mucronata subsp. capensis</i>, <i>Senecio halimifolius</i>, <i>Psoralea pinnata</i>, <i>Calopsis paniculata</i>, <i>Cyperus textilis</i>, <i>Onyxitis stricta</i>, <i>Zantedeschia aethiopica</i>, <i>Ornithogalum thyrsoides</i>, <i>Wachendorfia thyrsiflora</i>, <i>Watsonia meriana</i>, <i>Paspalum urvillei</i>; and; The drybanks adjacent to the floodplain wetlands: a mix of indigenous shrubs and grasses such as <i>Salvia africana-caerulea</i>, <i>Pelargonium cucullatum</i>, <i>Nemesia barbata</i>, <i>Athanasia juncea</i>, <i>Bulbine cepacea</i>, <i>Carpobrotus acinaciformis</i>, <i>Carpobrotus edulis</i>, <i>Cynodon dactylon</i>, <i>Themeda triandra</i>, and <i>Asparagus rubicundus</i>..

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			delineated aquatic features and transport them to a specific point of use without spilling; - The maintained infrastructure should not impact the shape and flow of the wetland/watercourse. - Shaping banks to have a gently sloping gradient down to the watercourse/wetland (the cutting of the banks, which is the current practice, is not encouraged). - If possible, use manual labour to do the maintenance works, particularly within the wetland areas along the pipeline.	
1.3 Impact Management Measures for Importing of repair/maintenance materials from commercial sources				
1.3.1 Importing of repair/maintenance materials for intended maintenance activities: If it is necessary, the required repair/maintenance materials be situated on site for maintenance activities to take place. The following general sequence of actions is required, ECO to provide assistance where necessary: Identify no-go areas Demarcate storage areas Identify stockpiling area and implement parameters Ensure the site is clear of all maintenance-related materials once the activity is complete	<u>Freshwater and Terrestrial Ecology</u> Disturbance of aquatic habitat Disturbance of vegetation	<u>Freshwater</u> Low <u>Terrestrial Ecology</u> Impacts on terrestrial likely to be Low/Medium	- No vehicular access, except via the two or three existing tweespoor tracks (dirt road) - No dumping or storage of materials, equipment or soil in the highly sensitive area (conservation area) and within the regulated area of the Soet River Canal and floodplain wetlands. - Good housekeeping practices should be followed to minimize any visual impacts.	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
1.4 Invasive alien vegetation control				
1.4.1 Clearing of alien invasive vegetation from watercourses: Alien invasives will be removed by hand using hand tools to remove the roots from the beds and banks of watercourses. All plant material will be removed and disposed of at licenced WDF.	<u>Freshwater and Terrestrial Ecology</u> Damage to the natural environment due to the use of machinery to remove alien vegetation. Disturbance of fauna (may cause death) and flora due to the use of diesel-based pesticides Poisoning of aquatic systems due to off-target damage from herbicides to riparian areas Erosion of areas that are cleared of vegetation cover, or that remain bare during times of heavy rainfall.	<u>Freshwater</u> Low <u>Terrestrial Ecology</u> This is typically a positive impact provided no damage to natural vegetation or stream embankments occurs during the clearing process. If piles of Invasive Alien Plants (IAPs) are not removed these can cause soil hotspots with fire events. Impacts due to pesticides on flora are likely to be Low. Impacts on fauna and freshwater are likely to be more severe. If no herbicides are allowed as stated above these (herbicides related) impacts are not applicable.	The following measures will ensure that the legal responsibilities in terms of alien vegetation control are met and that undesirable invasive plant species do not colonise the disturbed site: • It is recommended that all alien trees within a band of 25m from the footprint be cleared to allow the germination of seed from indigenous vegetation. Where necessary, topsoil and mulch (where approved by BMB) will need to be added and impacted areas revegetated with vegetation approved by BMB. • Prior to the removal of topsoil for trenching and excavations, the need to remove or clear all alien vegetation must be assessed and indicated by the freshwater and botanical ecologists or BMB. • Wherever possible, manual methods of alien vegetation removal shall be selected instead of using machinery, as this will have far less impact on the environment. Herbicide use may be considered (e.g. for stump treatments where alien trees are cut down by chainsaw), but may only be used if approved in writing, by BMB. • Should the use of registered herbicides be the most effective option for control of alien invasive vegetation, and agreed to in terms of an approved Method Statement, then this shall be undertaken in compliance with the terms and conditions of the SANS for handling, storage and disposal of pesticides (SANS 10206:2010, Edition 2.2): i) The use of diesel-based herbicides near watercourses shall not be permitted. ii) Only herbicides registered for the particular plant species requiring control shall be used. Where no herbicide has been registered, the least hazardous herbicide registered for a similar plant	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			species (i.e. another species of tree shrub or grass) may be used. iii) Herbicide operators mixing and applying herbicides shall be appropriately trained and supervised and shall be equipped with the requisite personal protective clothing in accordance with the SANS requirements and the herbicide labels. iv) Supervisors shall be literate, shall understand the instructions on the herbicide labels, and shall ensure that the necessary safety protocols are implemented. v) The requisite washing facilities and herbicide mixing area shall comply with the SANS requirements, as shall the transport, handling and storage of herbicides. vi) There is a very high risk of off-target damage from herbicides within riparian areas as many herbicides are toxic to aquatic systems, and only herbicides that are approved for use near a watercourse shall be used. vii) Herbicides shall not be used in windy or rainy conditions, and care shall be taken to avoid drift onto indigenous plants. • The disposal of alien invasive vegetation by burying or burning is prohibited in terms of national legislation, and shall not occur: • Alien vegetation shall be disposed of at licenced WDF, with proof thereof retained. • Follow up clearing should take place at least annually. • Work areas and access routes should be monitored for erosion or growth of invasive alien vegetation. Inspections are to be undertaken at	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			the end of the dry/low flow period and after the initial rainfall events.	
Morkel's Cottage Pipeline Maintenance Measures				
Generic Mitigation Measures				
1.5	General			
1.5.1	Site Access	<u>Freshwater</u> Destruction of or damage to vegetation and soils as a result of vehicles driving through sensitive areas. Erosion and sedimentation through the creation of preferential flow pathways and concentration of surface flows along tracks	<u>Freshwater</u> Medium	- Before repair/maintenance activities, the access route and movement to and from the maintenance site should be planned – aim to use designated and existing access routes where available. - Access to the pipeline is via various existing routes such as 11th Street, Onverwacht Street, off-Broadway Boulevard to Hammond Street and Morgendal Road in Strand. - The access via Morgendal Road is within a conservation area, disturbance in this area needs to be minimised.
1.5.2	Site Camp	<u>Freshwater</u> Trampling of vegetation and soil as a result of movement of workers through sensitive areas. Disturbance of flora and fauna through noise and light pollution during working hours. Destruction of or damage to vegetation through fire.	<u>Freshwater</u> Low to medium <u>Terrestrial Ecology</u> Low to Medium	- The location of the Contractor's main site camp must be approved by the ECO and BMB and will form part of the method statement. - All emergency numbers and the site safety officer's name and telephone numbers will be prominently displayed within the camp. In addition, posters with environmental "dos and don'ts" will also be displayed. - There will be adequate fire extinguishers within the site to deal with fires. Litter bins will be provided and placed at the site office. These bins will be lockable to prevent animals from accessing the bins. - If required, all tools and equipment will be stored in the storage container at the site camp. The site

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
	Erosion and sedimentation through the creation of preferential flow pathways and concentration of surface flows along pedestrian pathways.		camp will be fenced off with fencing panels and all relevant signage displayed.	
1.5.3 Site Demarcation and Access Road	<u>Freshwater</u> Destruction of or damage to vegetation and soils as a result of vehicles driving through sensitive areas. Erosion and sedimentation through the creation of preferential flow pathways and concentration of surface flows along tracks.	<u>Freshwater</u> Low/Medium <u>Terrestrial Ecology</u> Low to Medium.	- All working areas shall be clearly demarcated with no traffic, access, walking or trampling outside these areas. No walking or driving through the conservation areas, river canals or wetland areas is allowed. - Demarcation should be conducted in consultation with the contractor or persons responsible for the work to keep the disturbance area as small as possible. No construction/rehabilitation materials are to be stockpiled outside of the demarcated working areas. The no-go areas need to be fenced off with wire to prevent movement into these areas. A 2-strand method is to be used to prevent injury to or capture of animals. Strands are to be placed 300mm above ground and 750mm above ground respectively. - The ECO and Contractor will be present when the demarcation of the site is completed to confirm that the demarcation has been completed. Should an additional working area be required, an approval process must be followed in conjunction with the ecological specialist/s and/or BMB. - The Contractor may be penalised if they encroach outside of the working area.	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
1.5.4 Protection of Fauna and Flora	<u>Freshwater and Terrestrial Ecology</u> Drowning of fauna falling into containers or accumulations of surface water. Poor recovery Changes to plant community structure Loss of biodiversity Undesirable weeds	<u>Freshwater</u> Low <u>Terrestrial Ecology</u> Low to Medium	- Where vegetation clearance is required, such will be undertaken by the rehabilitation contractor, appointed to handle Search & Rescue ahead of the rehabilitation schedule. Alternatively, such may be overseen or undertaken by BMB. - In the event of any plants needing relocation, care must be taken to remove them without harm, to be transplanted to a suitable facility on-site and returned to the area after rehabilitation has finished. In all cases, no clearance of vegetation may take place in no-go areas without prior approval by BMB and ECO, and amendment to this EMS, where required. - A visual inspection will be done prior to machinery working in the area. It is anticipated that all animals will move away due to the noise and disturbance caused by the rehabilitation activities. However, should any fauna be present within close proximity to the working area, they should be encouraged to move away from the area (by means of noisy gestures) and no fauna should be harmed in the process. - Should any snakes or venomous / dangerous animals be found inside the working areas, the ECO, and if necessary, BMB, should be contacted to advise on correct removal procedures. - Open tanks or containers of water must be secured with lids to prevent fauna from falling into them. - Accumulations of water in pools and in excavated areas must be regularly inspected for fauna that have fallen in.	
1.5.5 Plant Rescue and Revegetation	<u>Terrestrial Ecology</u> Poor recovery Changes to plant community structure Loss of biodiversity	<u>Terrestrial Ecology</u> If implemented properly success is generally good and thus impacts Low	A Search & Rescue contractor will be appointed to undertake Search & Rescue for all areas where the clearance of indigenous vegetation is required. Alternatively, such may be undertaken or overseen by BMB.	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
	Undesirable weeds		- The involvement of the S&R contractor or BMB includes the collection of seeds, sods and cuttings and storing these until such time as rehabilitation is required. - The civil contractor will be responsible for topsoil clearing (under guidance from the ECO or ecologist) and for returning the topsoil to the construction areas as soon as possible after construction for the search & rescue contractor to initiate seeding / revegetation of these areas. - Once rehabilitation is done, no contractors are allowed to disturb the areas again.	
1.5.6 Eating Areas	<u>Freshwater</u> Litter entering sensitive areas.	<u>Freshwater</u> Low	- Provision must be made for employee facilities including shelter and eating areas. Eating areas shall be provided and kept clean and hygienic. Drinking water facilities will be provided. - No fires will be allowed on site. - Animal-proof bins with lockable lids must be provided in demarcated eating areas.	
1.5.7 Topsoil Management	<u>Freshwater and Terrestrial Ecology</u> Runoff laden with fine sediments from stockpile areas entering surrounding sensitive habitats. Erosion of topsoil. Weed contamination.	<u>Freshwater</u> Low to Medium <u>Terrestrial Ecology</u> Impacts are likely to be either Low, seldom Medium, and in rare cases High.	- Where topsoil is excavated, such must be stored directly adjacent to the trench or excavated area (as advised by the ecologist or BMB) in designated stockpiles adjacent to the works identified and supervised by the botanical ecologist/BMB inside the demarcated route footprint. - Stockpiled topsoil material must be protected from wasting (e.g. UV-resistant shade cloth (at least 60%) or hessian netting) through erosion or contamination by other excavated materials. The topsoil must be demarcated from the working area and no persons or machinery should be allowed on the topsoil. - No external soils are to be imported from any other sites (unless authorised by the botanical ecologist, BMB or ECO) in order to prevent alien seed contamination. The stockpiled topsoil is to be left undisturbed until backfilling is finished. Stockpiles	

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			of topsoil must not be higher than 2m and may not be removed from the site or used for any purpose other than in the final rehabilitation of the site. - The stockpiles shall not be compacted or disturbed and shall be domed at the top to promote runoff. The period between the stockpiling of topsoil and its utilisation shall be as short as possible, and ideally, the topsoil should be transferred to the reinstatement area following the installation of the pipes and cables, or other infrastructure. This would also avoid double handling. Any rocks removed during site establishment should also be stored as advised by the ecologist and returned, facing the same way as when it was found. - All topsoil to a depth of 40cm must be removed in any areas where excavation will take place in the High sensitivity areas. This must be carefully stored outside the High sensitivity areas and covered with black plastic to prevent drying out and germination. - Topsoil must be stored for the minimum possible time. This must then be replaced on the surface and gently tamped down whenever work disturbance-related work is completed in this area.	
1.5.8 Dewatering of Trenches and Excavations	<u>Freshwater and Terrestrial Ecology</u> Pollution or sedimentation of adjacent and/or downstream habitats Long-term, potentially irreversible changes to soil structure and soil chemistry leading to vegetation die-off, and changes to plant community structure.	<u>Freshwater</u> Low to Medium <u>Terrestrial Ecology</u> Impacts on terrestrial vegetation are likely to be either Low, seldom Medium, and in rare cases High. Dependent on the extent and severity of the spill event.	- No water from any maintenance activities (e.g., dewatering excavations) may be discharged/wasted into the natural environment, or any areas around such activities, or any watercourses (even if deemed to be clean), without approval by BMB. If excess water is entering the activity areas, such must either be pumped into a water truck or a settling tank/pond. - The ECO must be present on site for any work in natural vegetation (conservation area). - If a temporary above-ground welded HDPE pipeline is to be used, relevant hot work permissions and waste removal (for removal of HDPE shavings) etc,	

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			must be in place, together with approval from BMB, prior to undertaking such. • If the above dewatering methods are not feasible, alternative methods may only be undertaken after written approval by BMB. • Trenches and excavations should remain open for as short a period as possible.	
1.5.9 Temporary Stockpile Location	<u>Freshwater and Terrestrial Ecology</u> Runoff of silt-laden water into sensitive areas. Destruction of vegetation in stockpile areas, which then leads to local erosion and downstream or downslope sedimentation. Establishment and encroachment of invasive alien plants into the surrounding landscape. Creation of concentrated surface flowpaths and subsequent erosion. Poor recovery Changes to plant community structure Loss of biodiversity Undesirable weeds	<u>Freshwater</u> Medium <u>Terrestrial Ecology</u> If implemented properly success is generally good and thus impacts Medium or even Low.	• Temporary stockpile areas must be identified by the ECO, prior to use. The Stockpile areas should not be within the Conservation Area. These areas would be for bedding materials, pipes, cables, and spoil materials (e.g., rock and soil). The stockpile areas must be clearly demarcated. • All the sites require pre-utilization control of the alien species present on them and in a 25m wide buffer around the sites. Regrowth of alien seedlings must be controlled throughout site use and rehabilitation. • All the sites that are used will need the top materials present on them stored for rehabilitation purposes. These materials will need to be covered using at least 60% shade cloth. Note that a hessian cover, if used, needs to be strong and dense and able to function through environmental rigours for extended periods, as the stockpile areas will be utilized for the duration of the construction activities. • The perimeters of the stockpile and storage areas will need to be delimited using a fence to avoid ingress into the surrounding veld. • Stockpile locations are to be fully rehabilitated after completion.	

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1.5.10 Traffic Management	<u>Freshwater</u> Destruction of vegetation and compaction of soils in sensitive areas where vehicles drive off the roads or create wide turning circles.	<u>Freshwater</u> Low	• All traffic signage and markings will be in accordance with the South African Roads and Traffic Signs Manual. Care and planning will be taken to ensure minimum traffic. Appropriate traffic warning signs and flagmen will be placed when required. • Within close proximity to the Morkel's Cottage bulk water pipeline maintenance area there is a network of existing tar roads which will be used for all construction and operational vehicle movement. Care must be taken when driving on these roads as pedestrians and fauna may be present. Signs will be placed on the access road after the gate and speed limits will be reduced to 40 km/h. • If an access track is going to be blocked because of rehabilitation activities (e.g., use of cranes), all contractors and any local road-using organisations (e.g., BMB) will be notified and the blocking of roads will only be done once approved by the ECO. Flag persons will be used where possible to indicate access control areas and alternative routes. • Appropriately secure transported materials, to ensure safe passage between destinations.	
1.5.11 Heritage Resources	<u>Heritage</u> Should any heritage resources, including evidence of graves and human burials, or archaeological material be discovered during the execution of the maintenance activities, all works must be stopped immediately and Heritage Western Cape must be	<u>Heritage</u> Very low	• If an object of heritage, archaeological or paleontological origin is discovered, the activity in the area must be stopped. The site personnel will then be informed that the area is a no-go area, and the ECO, BMB and Heritage Western Cape (HWC) must be informed, to advise on the way forward.	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
	notified without delay.			
1.5.12 Noise and Light Control	<u>Freshwater</u> Disturbance of flora and fauna through noise and light pollution during working hours	<u>Freshwater</u> Negligible	All construction-related works shall endeavour to be undertaken during normal daylight hours. All reasonable steps must be taken to minimise noise and mechanical vibrations and noise levels must be below 35 dB from 18:00 – 06:00 daily. Prior approval for afterhours work is required from the ECO and BMB, with lighting being directed towards the site footprint (i.e., away from all sensitive areas).	
1.5.13 Dust Management	<u>Freshwater</u> Discharge of dust suppression water into wetlands and rivers, causing deterioration in water quality, such as through increased turbidity, nutrient loading, introduction of high levels of iron and magnesium in groundwater, etc	<u>Freshwater</u> Low	- Mitigations for dust suppression (e.g., using a water truck on access roads) must be used on site to reduce dust generation when required during hot and/or windy conditions. - The proponent must also comply with the provisions of the City of Cape Town Air Quality Management By-Law, PG 7662 of 17 August 2016 as amended, especially but not limited to Section 4: Duty of care (Reasonable measures to prevent air pollution) as well as the NEM: AQA and the National Dust Control Regulation 827 dated 01 November 2013 promulgated in terms of the NEM: AQA as amended. - Should the need arise, the City of Cape Town's Air Quality Officer reserves the right to call for a Site-Specific Dust Management Plan (DMP), to be drafted in accordance with Section 26 (3) of the City of Cape Town Air Quality Management By-Law 2016, for approval by the Air Quality Management Department. - Once approved, the DMP must be incorporated into the Final MMP and must be complied with on site at all times. - Best Practicable Environmental Options should be implemented during all phases of the repair and maintenance of the bulk water pipeline to prevent	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			dust nuisances which may impact the receiving environment.	
1.5.14 Waste Management	<u>Freshwater and Terrestrial</u> Litter spreading into sensitive areas, such as the conservation area, wetlands and channels.	<u>Freshwater</u> Low to negligible	- Solid waste shall be stored in animal-proof bins and regularly disposed of and cleaned offsite as necessary. Waste management on site will include regular clean-ups (at least twice daily) around the construction and camp sites, and a record of all waste removal and disposal slips will be maintained. On completion of the construction works, a search for any litter on site and in the immediate surroundings will be conducted. - Colour-coded bins (red, yellow, and green), clearly labelled, shall be used for hazardous waste, general waste and recyclable waste respectively. - No open bins will be allowed in the natural areas. Eating areas will be provided for employees with signs indicating general waste bins. - Rubble will be removed by truck from the site camp to a licenced WDF before the site waste area reaches ~80% full. Fuel-contaminated soil will be stored in clearly marked waterproof containers with lids or in spill bags. If cement is used, cement bags will be kept separately in a designated enclosed area to prevent contamination of stormwater and runoff. - The waste must be disposed of at a licenced WDF (e.g., hazardous waste must be disposed of at a suitable hazardous WDF). No burying/burning of waste will occur on site. Certificates of disposal must be kept on file on site. - Waste recycling must be explained in a toolbox talk to encourage recycling on site, and at home. - The safe disposal slips of all waste disposed of must be retained on site for inspection.	
1.5.15 Ablutions	<u>Freshwater</u> Pollution of wetlands and rivers through	<u>Freshwater</u> Low to negligible	Chemical toilets shall be available at the site camp and close to the maintenance areas. The ablutions shall be located outside of wetlands and away from	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
	leaks or spills from temporary toilets. Pollution of wetlands and rivers as the result of deposition of human waste.		rivers. These facilities will be secured to prevent toppling and spillages into the environment. - Regular removal of chemical toilet content will be done by a registered contractor and disposal slips must be available on site for inspection. - Wild animals must not have access to these facilities.	
1.5.16 Fire Prevention and Management	<u>Freshwater</u> Destruction of vegetation through accidental fires. Removal of vegetation cover, leading to erosion and sedimentation.	<u>Freshwater</u> Medium to high	- All employees and site personnel must be informed and made aware of the dangers associated with smoke/fire. No cooking or open fires will be permitted on site. Smoking will only be permitted in designated smoking areas, with cigarette butts collected and disposed of with the general waste stream. Smoking is not allowed in the area where fuel/ refuelling occurs. - An appropriate number of serviced fire extinguishers and fire beaters shall be provided in all working areas. Personnel on site must be trained in the operation of the fire equipment in order to contain a fire as fast as possible. A designated fire marshal will be tasked with reporting and/or liaising with Incident Command and/ or BMB should a fire be identified in the area or on site. - Should evacuation be called, key escape routes have been mapped, and personnel will be evacuated to the contractor's main site camp.	
1.5.17 Hazardous Chemical Management	<u>Freshwater and Terrestrial Ecology</u> Pollution of wetlands and rivers through accidental spills. Long-term, potentially irreversible changes to soil structure and soil chemistry leading to vegetation	<u>Freshwater</u> Low to Medium <u>Terrestrial Ecology</u> Impacts on terrestrial vegetation are likely to be either Low, seldom Medium, and in rare cases High. Dependent on the extent and severity of the spill event.	The only hazardous materials on site are anticipated to be fuels, oils, paint and cement. All hazardous building materials shall be dealt with in accordance with the relevant Safety and Environmental Legislation. All hazardous chemicals will be stored in contained areas to prevent spills, and spill kits and fire extinguishers will be available wherever hazardous chemicals or fuel are stored or used. All hazardous substances shall be stored in the store container with properly displayed and visible warning signs.	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
	die-off, changes to plant community structure, favouring weedy species, and possible erosion.		- The Material Safety Data Sheets (MSDS) for all hazardous chemicals must be kept on file onsite. Hazardous materials shall be handled as per each product's MSDS. All staff required to handle and use such hazardous substances shall receive adequate training. - Hazardous waste and waste fuels and oils shall be stored in appropriate containers that will not corrode or leak. These containers shall be properly marked to indicate contents. Drip trays will be placed under all plants and machinery using hazardous chemicals as well as under containers of hazardous materials being used on site. - All hazardous material/waste shall be separated on site and disposed of at a licensed WDF, with proof thereof retained.	
1.5.18 Hydrocarbon Management	<u>Freshwater and Terrestrial Ecology</u> Pollution of wetlands and rivers through accidental spills. Long-term, potentially irreversible changes to soil structure and soil chemistry leading to vegetation die-off, changes to plant community structure, favouring weedy species, and possible erosion.	<u>Freshwater</u> Low to Medium <u>Terrestrial Ecology</u> Impacts on terrestrial vegetation are likely to be either Low, seldom Medium, and in rare cases High. Dependent on the extent and severity of the spill event.	- Good housekeeping practices should be followed, such as the use of machinery which does not leak oils or other substances, and if applicable adequate waste disposal and removal, as well as the adequate provision and servicing of toilets. The site of the maintenance activity must be managed so that material (especially cement and fuel products) is not washed into the wetland/watercourse during storm events. Emergency spill kits should be kept on site - Surfaces, where the possibility of oil spillage exists, shall be prepared in such a way as to mitigate these risks. Drip trays will be placed under all parked or stationary plant. Drip trays are to be cleaned out if there is any spill with spill kits, and hazardous waste disposed of licenced WDF, with proof thereof retained. Small quantities of fuel are to be stored in the store container at the end of every shift and site security will be equipped with fire extinguishers. Machinery prone to oil or fuel leakage must be located at least 50 m away from the edge of any	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			watercourse or wetland, and the area adequately bunded to contain leakages. - Mitigation in the form of plastic sheeting in conjunction with large high walled drip trays will be used during refuelling activities. Each refuelling, or storage site shall be in possession of a chemical/hydrocarbon spill kit and fire extinguisher. Signs showing 'NO SMOKING' will be placed where refuelling is taking place. The machine/plant will be parked and switched off when filled from the diesel bowser. The mobile diesel bowser will be parked at the site camp when not in use. The diesel bowser will visit the maintenance sites only to fill the machines/plant. Once machines are filled, and must return to park at the site camp. Small plant to be refuelled using a petrol jerry can. Drip trays, spill kits and fire extinguishers to be in place for small plant re-fuelling. - Inspections and checklists will be done on machines and leaks will be reported to the Site Manager/ Site Supervisor.	
1.5.19 Emergency Spill Procedures	<u>Freshwater and Terrestrial Ecology</u> Pollution of wetlands and rivers through accidental spills. Long-term, potentially irreversible changes to soil structure and soil chemistry leading to vegetation die-off, changes to plant community structure, favouring weedy species, and possible erosion.	<u>Freshwater</u> Low <u>Terrestrial Ecology</u> Impacts on terrestrial vegetation are likely to be either Low, seldom Medium, and in rare cases High. Dependent on the extent and severity of the spill event.	- All employees and site personnel will be informed and made aware of the emergency procedures in the form of a toolbox talk, for handling spills of hydrocarbons, chemicals or contaminated water (including water containing sediment/fines). Telephone numbers of emergency services will be posted at the site office and in all site vehicles. Team leaders will have the emergency services' telephone numbers stored in their cell phones. - Materials and equipment necessary for dealing with spills and leaks (such as spill kits and stockpiled sandbags) will be obtained for the site as required. - The relevant MSDS will be available on site. A drip tray will be placed under the mobile fuel bowser when on site. If a spill should occur, the following will be actioned:	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			• The ECO and BMB must be notified of the incident. • All machinery will be removed immediately from the area, and the area will be cleared using absorbent materials. • The contaminated area will be demarcated and kept clear of any traffic. • Spillages will be cleaned with a spill kit and the contaminated material will be removed from the site and disposed of at licenced WDF, with proof thereof retained. • Proof of legal disposal will be kept on site for inspection. • The contaminated material will be stored on site in the site camp in a clearly demarcated area for contaminated material until it is disposed of off-site. A record will be kept of all spillages.	
1.5.20 Erosion and Sedimentation Control	<u>Freshwater</u> Disturbance of river canal, flood plain or wetland habitat during removal of sediment. Destabilisation of slopes, banks and beds of wetlands and rivers, leading to increased mobility of sediments into sensitive areas. Increased sedimentation in sensitive areas, such as wetlands, riparian areas and channels. Smothering of wetland substrates.	<u>Freshwater</u> Low	• Access roads used by the Contractor should be inspected daily to identify any risk of erosion concern along the tracks. The access roads will sustain heavy traffic during construction and can be prone to erosion, especially at stream crossings. Should any erosion risk occur, the ECO should be notified, and corrective action approved by the ECO and BMB. • If water run-off with high suspended solids and turbidity is observed coming from the disturbed areas associated with the work, temporary sediment trapping mechanisms should be put in place downstream of the activity to filter water from the maintenance works (such as a silt curtain). • Any cleared sediment, vegetation or spoil material associated with the maintenance activity should be removed from the river channel to a suitable disposal site. • The maintained infrastructure should not impact the shape and flow of the wetland/watercourse. Shape	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			banks to have a gently sloping gradient down to the watercourse/wetland (the cutting of the banks, which is the current practice, is not encouraged).	
1.5.21 Cement Handling	<u>Freshwater</u> Pollution of river canals and wetlands as the result of the discharge of construction-related pollutants, such as cement, into these sensitive ecosystems.	<u>Freshwater</u> Low	- The use of ready-mix concrete instead of batching onsite is recommended. Trucks delivering concrete will park outside and adjacent to the working areas and deliver concrete by the use of chutes (enough chutes must be brought to the site to ensure that there is no spillage). During the maintenance/repair process, no plant or equipment will be allowed to be washed in, or near, any watercourse or wetland or near any surface water. Trucks are to be cleaned at the supplier's yard. - If small batching is required, this will be done next to the relevant structure after approval from the ECO. If on-site concrete mixing is necessary, plastic must be laid on the ground and a wooden board must be used on which mixing will occur. A berm will be created around the plastic to contain any run-off material. All contained runoff will be controlled and disposed of as builder's rubble once dried. Cement bags will be stored in the site's main camp in containers. Mix any concrete, other materials or potential contaminants at least 10m away from the delineated aquatic features and transport them to a specific point of use without spilling. - The batching of concrete or mortar should not be done on windy days to reduce windblown cement dust entering the natural environment. Should the batching of concrete or mortar need to be conducted on a windy day then the batching area must be equipped (e.g., fabric shield walls) to prevent any cement dust from blowing away. - Any tools or equipment that requires cleaning will be cleaned at one fixed location at the site camp. This will be agreed upon and approved by the ECO. A bunded area that is sloped, and lined with	

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			250-micron DPC plastic covered with sand, will be constructed. Any wastage and water runoff that will be a result of this cleaning process must be contained in this wash area. This wash area must be cleaned regularly or as required and the waste will be disposed of off-site. Any visible spillages will be removed immediately from the site area. Excess concrete will be stored in a skip provided and disposed of as building rubble.	
1.5.22 Working Hours	<u>Freshwater and Terrestrial Ecology</u> Disturbance of flora and fauna through noise and light pollution during working hours	<u>Freshwater</u> Low <u>Terrestrial Ecology</u> Low	Work must take place during daylight hours unless approved in writing by the ECO and BMB. If lights must be used at night, these must be directed away from wetlands and rivers.	
1.5.23 Site Remediation and Rehabilitation	<u>Freshwater and Terrestrial Ecology</u> Persistence of unvegetated or unstable areas if rehabilitation is not done according to plan. Poor recovery Undesirable weeds	<u>Freshwater</u> Low <u>Terrestrial Ecology</u> If implemented properly with reinstatement of topsoil recovery is generally good and thus impacts Medium or even Low	- Any cleared sediment, vegetation or spoil material associated with the maintenance activity should be removed from the river channel to a suitable disposal site. - If topsoil removal was required during the rehabilitation, then such must be returned under the supervision of the rehabilitation contractor and/or BMB. The rehabilitation must be monitored by the ECO and overseen by BMB, as required. The end-product of the construction areas must blend into the adjacent terrain and topography as directed by the rehabilitation contractor. - Should the rehabilitation of any areas beyond the demarcated site be necessary because of contractual non-compliances by the contractor, these shall be dealt with in terms of the rectification measures deemed necessary by the ecological specialist/s or rehabilitation contractor or BMB and ECO.	After the maintenance works are complete, any areas within the maintenance footprint that have been degraded from their condition before construction and as a result of the maintenance activities must be restored to their former condition. Disturbed areas should be revegetated with appropriate indigenous plant species. Suggested wetland plants for revegetation of disturbed areas are as follows: More permanently wet areas: <i>Schoenoplectus scirpoides</i>, <i>Bolboschoenus maritimus</i>, <i>Eleocharis limosa</i>; - Wetland margins / seasonally wet areas: <i>Salix mucronata subsp. capensis</i>, <i>Senecio halimifolius</i>,

Actions	Potential impacts of these actions	Severity of impacts	Measures to mitigate the severity of these impacts	Corrective/remedial measures if mitigation measures are not properly implemented
			All reasonable measures should be undertaken to ensure that the maintenance activities minimise any future erosion of the wetland/watercourse bed and banks.	<i>Psoralea pinnata</i>, <i>Calopsis paniculata</i>, <i>Cyperus textilis</i>, <i>Onyxitis stricta</i>, <i>Zantedeschia aethiopica</i>, <i>Ornithogalum thyrsoides</i>, <i>Wachendorfia thyrsiflora</i>, <i>Watsonia meriana</i>, <i>Paspalum urvillei</i>; and; The dry banks adjacent to the wetlands: a mix of indigenous shrubs and grasses such as <i>Salvia africana-caerulea</i>, <i>Pelargonium cucullatum</i>, <i>Nemesia barbata</i>, <i>Athanasia juncea</i>, <i>Bulbine cepacea</i>, <i>Carpobrotus acinaciformis</i>, <i>Carpobrotus edulis</i>, <i>Cynodon dactylon</i>, <i>Themeda triandra</i>, and <i>Asparagus rubicundus</i>. - Monitor disturbed areas to determine if sufficient indigenous vegetation growth has been achieved. - Manage weed infestations if required.

6 ENVIRONMENTAL MONITORING AND REPORTING / AUDITING

The development of an MMP for a project is an important task that is aimed at assigning responsibilities and mitigation options to a variety of activities. However, it can be an ineffective tool in the absence of auditing or monitoring activities. Auditing or monitoring activities involve the structured observation, measurement, and evaluation of environmental data over time.

- The overall responsibility to ensure that the MMP is implemented rests with the Proponent, who shall appoint appropriate engineering, environmental and contracting teams to undertake the work.
- The ECO shall inspect the site prior to any site clearing activities commencing in preparation for maintenance activities; at least once (1) a week during the repair/maintenance phase; and on completion of the maintenance work.
- The ECO shall report on the level of compliance with this MMP to the Proponent and to the relevant authorities.

6.1 Disciplinary action

The MMP is a legally binding document. Non-compliance with the MMP shall 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 rehabilitate 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 National Environmental Management Act (No.107 of 1998)
- The National Water Act (No. 36 of 1998)
- The Occupational Health and Safety Act (No. 85 of 1993)

The Contractor shall 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 reports.
- Environmental damage ensues due to negligence.
- The Contractor fails to comply with corrective or other instructions issued by the ECO or DEA&DP within a specified time (maximum two weeks).
- 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 Proponent (on advice by the ECO and/or CCT BMB, where penalties are being applied in terms of the Environmental Specification of a contract. If the Contractor is being prosecuted by the DEA&DP or DWS in terms of the NEMA or NWA, then the courts will apply penalties in terms of such legislation, taking into account the severity of the incident.

7 Conclusion

The recommendations and mitigation measures prescribed in this MMP have been formulated with the intention of addressing the potential impacts of the proposed Morkel's Cottage bulk water pipeline on the environment. Based on the assessments from the specialists, the overall risk rating of the proposed maintenance work is considered low except where the pipeline traverses the conservation area (CBA1) which is an area of high sensitivity.

Understanding the contents of this MMP by contractors and other individuals involved in proposed maintenance work will help achieve "environmental best practice," ensuring that maintenance activities lead to a sustainable outcome.

To ensure effective implementation of the MMP, all parties involved in the project will have to comply with all mitigations and recommendations set out in this MMP.

In diversity there is beauty and
there is strength.

MAYA ANGELOU

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