LORNAY
ENVIRONMENTAL CONSULTING

Environmental Management Programme

Proposed Residential Development on
Remainder of Erf 1489 and Access Road on Erf 1490, Vermont

22 October 2025

Consultant:

Michelle Naylor | Senior Env. Consultant **|** M.Sc., Pr. Sci. Nat., EAPASA
cell: 083 245 6556 **|** michelle@lornay.co.za **|** www.lornay.co.za

DOCUMENT CONTROL SHEET

ISSUED BY: **Lornay Environmental Consulting (Pty) Ltd**
Unit 5(1)F, Hemel & Aarde Wine Village
Hermanus
7201
Tel: 083 245 6556
www.lornay.co.za

CLIENT: WESTRAND INVESTMENTS 1015 CC

TITLE: Residential development on Re/1489 and 1490, Vermont, Hermanus

REFERENCE: EMP/1489/Rev1

REPORT DATE: 22 October 2025

STATEMENT OF INDEPENDENCE

Lornay Environmental Consultants nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any financial or other interest which may affect the independence of the author(s) or Lornay Environmental Consulting. The consultant fees paid to Lornay Environmental Consulting for the completion of this report is in line with standard professional fees and daily rates. The settling of the professional fee is not dependent on the outcome of the report.

DETAILS OF THE AUTHOR(S)

EAP ORGANISATION:	Lornay Environmental Consulting (Pty) Ltd
AUTHOR(S):	Michelle Naylor
EAP REG. NO.:	EAPASA (2019/698)
SACNASP REG. NO.:	Pr. Sci. Nat (400327/13)
EAP QUALIFICATIONS:	Bachelor of Science (Hons); Master of Science (Rhodes University), EAPASA., SACNASP., IAIASA., cand. APHP
AUTHOR(S):	Njabulo Magoswana
EAP REG. NO.:	CAND. EAPASA 2021/3178
EAP QUALIFICATIONS:	BSc Hons., Environmental Geography

CONTENTS

LIST OF FIGURES

LIST OF TABLES

KEY TERMS AND ABBREVIATIONS

BAR	Basic Assessment Report
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)
EA	Environmental Authorisation
ECA	Environment Conservation Act (Act No. 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:BA	National Environmental Management Biodiversity Act (Act No. 10 of 2004)
NEM:WA	National Environmental Management Waste Act (Act No. 59 of 2008)
PPE	Personal Protective Equipment
SDS	Safety Data Sheets
SHE	Safety Health and Environmental

Basic Assessment - Process followed to receive Environmental Authorisation (EA) from the Competent Authority, necessitated by NEMA. The Basic Assessment Report (BAR) is drafted in line with the legislation.

Competent authority - The Department of Environmental Affairs and Development Planning (DEA&DP)

Contractor - the main or specialised contractors as appointed by the developer / applicant for the execution of the works, including all sub-contractors

Developer / Applicant – as per EA

Environmental Control Officer (ECO) - a suitably qualified person to be appointed by the Developer / Applicant, to oversee the implementation of the EMP and environmental agreement until the completion of works on the site

Environmental Management Plan / Programme (EMP/r) - this document, approved by the competent authority, to control the implementation of the works on the site in such a way as to ensure that they do not result in undue or reasonably adverse impacts on the environment.

General waste - Waste that does not pose an immediate hazard or threat to health or to the environment, and includes domestic waste, building and demolition waste, business waste and inert waste.

Hazardous waste - 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/or the environment.

Project manager - Overall responsible and accountable person for the site during the construction, operation and decommissioning of the facility.

Project Management team - The responsibility of the EMP implementation resides with this team. This team includes a Project Manager and appointed contractors and consultants.

Safety, Health and Environmental Officer (SHE Representative) – Applicant / developer will appoint one Safety Health and Environmental Officer, assisting the construction manager on Safety, Health and Environmental aspects of the project on the construction site.

Site Manager **–** the employee of the main contractor responsible for the day-to-day control of all activities and operation on site.

Sub-contractor and Contractor - Any provider of services, goods or people to the Applicant / Developer, for the construction, operation or decommissioning.

LEGISLATIVE REQUIREMENTS

A Basic Environmental Assessment process is applicable in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) regulations (2014) (as amended). Appendix 4 of the NEMA EIA Regulations (GN. R982) sets out the minimum requirements for the drafting of an Environmental Management Plan (EMP). This EMP has been created in fulfilment of these prescribed requirements for the construction and post-construction phase of the activity applied for. The implementation of this EMP will be a condition of approval of the Environmental Authorisation (EA). Failure by the applicant, to comply with this EMP, will therefore constitute an offence, and the applicant and / or the appointed contractors can be held liable for penalties and / or legal action. It is therefore important that a copy of this EMP be issued to each contractor, preferably at the appointment stage, in order to allow for the costs of implementing the EMP, to be included in cost proposals. This will also ensure that the contractor is aware of his responsibilities prior to appointment and commencement. Each appointed contractor involved in the project, as well as the project manager (as applicable), will be required to sign for and thereby acknowledge contents of, the approved EMP and therefore abide by the specifications of the document and any amendments thereto.

Other applicable legislation

The Constitution of The Republic of South Africa (Act 108 of 1996)

The Constitution of the Republic of South Africa states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

National Environmental Management Act (Act 107 of 1998)

The National Environmental Management Act (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant competent authorities. NEMA is a National Act, which is enforced by the Department of Environmental Affairs (DEA). These powers are delegated in the Western Cape to the Department of Environmental Affairs and Development Planning (DEA&DP).

National Environmental Management: Biodiversity Act (Act 10 of 2004)

Chapter 4 of the National Environmental Management: Biodiversity Act, 2004 (NEMBA) deals with threatened and protected ecosystems and species. The need to protect listed ecosystems is addressed (Section 54). Section 73 deals with Duty of Care relating to invasive species, while Section 76(2) calls for development of invasive species monitoring, control and eradication plans by all organs of state in all spheres of government, as part of environmental management plans required in terms of Section 11 of NEMA.

National Environmental Management: Air Quality Act (Act No. 39 of 2004)

Section 32 prescribes measures for the control of dust, Section 34 prescribes national standards for the control of noise and Section 35 prescribes measures for the control of offensive odours, any or all which may be experienced during the construction or operation of an applicable development.

National Environmental Management: Waste Act (Act No. 59 of 2008)

The National Environmental Management: Waste Act (NEM:WA) provides for specific waste management measures (disposal and storage) and the remediation of contaminated land.

Environment Conservation Act (Act No. 73 of 1989)

The Environment Conservation Act (ECA) provides provision for the prevention of littering by employees and subcontractors during construction and the maintenance phases of development.

Occupational Health and Safety Act (Act No. 85 of 1993)

Section 8 outlines the general duties of employers to their employees and section 9 outlines the general duties of employers and self-employed persons, to persons other than their employees.

Hazardous Substances Act (Act No. 5 of 1973)

This Act provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.

1. INTRODUCTION

Lornay Environmental Consulting (Pty) Ltd has been appointed by Westland Investments 1015 CC (hereafter referred to as "the applicant") to facilitate compliance with the National Environmental Management Act (NEMA, Act 107 of 1998), as amended, and the Environmental Impact Assessment (EIA) Regulations of 2014, as amended. This appointment relates to the application for environmental authorisation of listed activities associated with the proposed residential development on Remainder of Erf 1489 (RE/1489) and the upgrade of the access road over Erf 1490, located in Vermont, Hermanus, Western Cape.

The Environmental Management Programme (EMPr) presented in this document is a legally binding instrument applicable to the applicant, all successors in title, and any future developers or property owners, whether they assume ownership of the whole or any portion of the development. This EMPr governs the proposed residential development on RE/1489 as outlined in this application, including any future amendments to the approved layout or development plan. It further extends to all property owners within the development, ensuring a consistent and enforceable framework for environmental management.

This EMPr has been prepared and submitted as part of the Basic Assessment process, in accordance with the requirements of NEMA and its associated regulations. It serves as a comprehensive guideline for managing environmental impacts during both the construction and post-construction phases of the project. The scope of the development includes the establishment of roads, bulk services, residential homes, and associated infrastructure on RE/1489 and the road reserve over Erf 1490. The document is prescriptive in nature, detailing mitigation measures and assigning specific responsibilities to individuals or organizations tasked with implementing actions during the construction and post-construction phases.

The primary objective of this EMPr is to minimise or, where possible, entirely avoid potential environmental impacts arising from the proposed development. It addresses key activities such as vegetation clearing, civil works, residential construction, rehabilitation plans and the installation of services, while promoting sustainable development practices. As a dynamic document, the EMPr is designed to be adaptable, allowing for periodic updates to reflect changing site conditions or project requirements. While it is compiled as an integral component of the Basic Assessment process, this EMPr becomes legally enforceable upon approval by the Competent Authority, Department of Environmental Affairs and Development Planning (DEADP). It should be read in conjunction with the Aquatic Biodiversity Impact Assessment Report, which provides additional context of the site and specifications for the development.

Compliance with the EMPr is critical throughout the construction and post-construction phases, particularly during activities such as vegetation clearing and the installation of civil services and construction of road and residential units. Upon completion of the construction phase, a completion audit is anticipated to be required, as may be stipulated in the Environmental Authorisation (EA). This audit will verify adherence to the EMPr and ensure that all environmental management commitments have been met.

This EMPr has been drafted in strict accordance with Section 24N of the National Environmental Management Act (NEMA, Act 107 of 1998), ensuring alignment with statutory requirements and best practices in environmental management. It reflects a commitment to balancing the developmental needs of the proposed residential project with the imperative to protect and preserve the natural environment.

2. DEVELOPMENT PROPOSAL

The preferred site for the proposed residential development is RE/1489, situated in Vermont, Hermanus, Western Cape. This property represents one of the last remaining undeveloped residential erven in the area, offering a unique opportunity for sustainable residential expansion. RE/1489 spans an area of approximately 1,0479 ha and benefits from an existing access road, an extension of Kolgans Close, that will connect to the proposed internal private roads. The development proposal entails the subdivision and development of RE/1489 to establish eighteen (18) new residential erven, a designated open space area, and two private roads. The existing access road, made of gravel, will be upgraded to tar road. Below are the components of the proposed development.

Residential erven

The residential component of the development will occupy an area of approximately 7047m², designated for single residential erven.

Roads

Private road is proposed to facilitate access and connectivity within the residential development. The road will cover a footprint of approximately 3861 m^2 which is an extension of Kolgans Close, providing a direct link to the residential erven.

Open Space

A portion of the site, covering approximately 1090 m², will be allocated as open space. This area is intended to be vegetated, with appropriate indigenous plants.

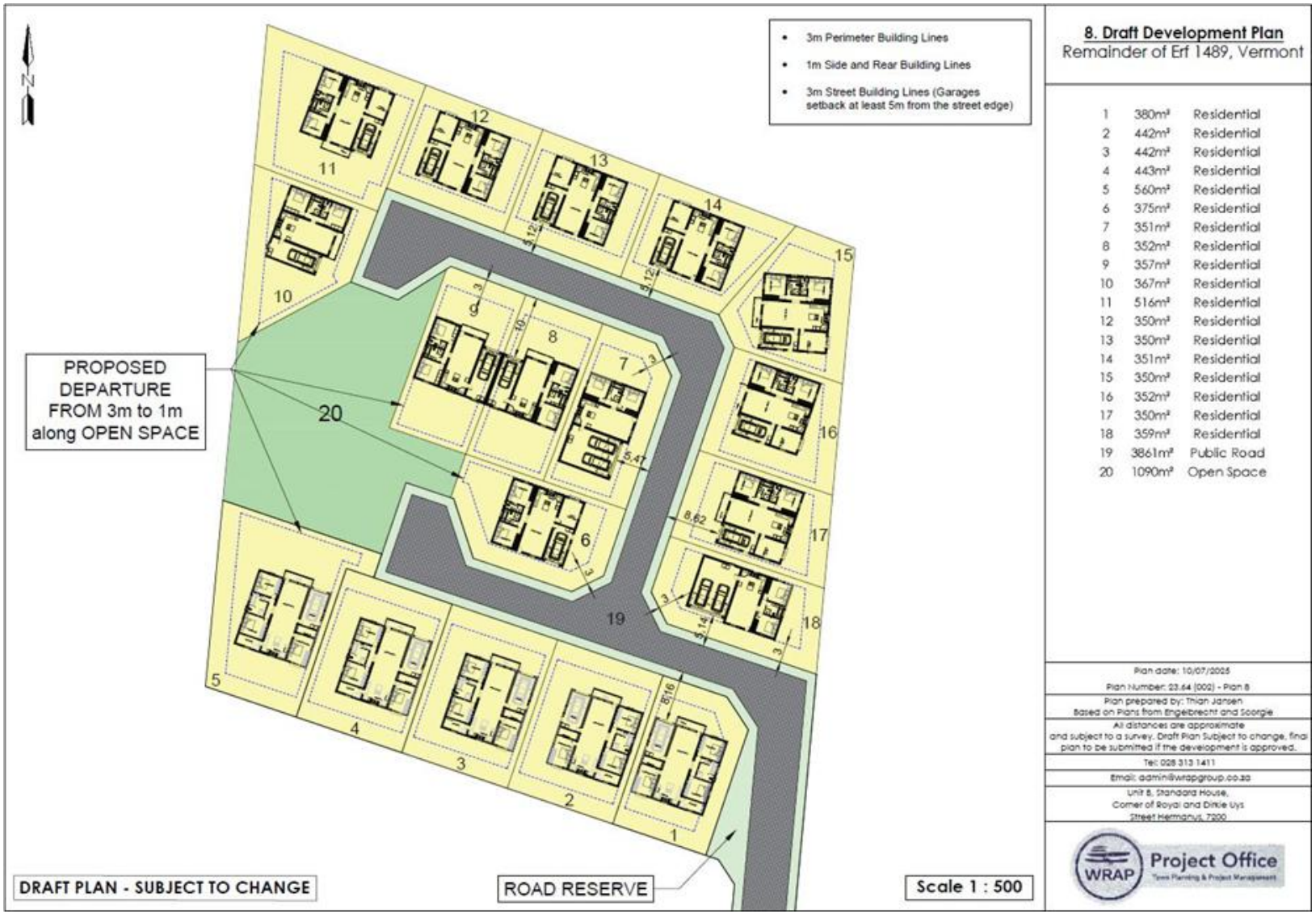

Figure 1: Proposed site development plan.

3. TERMS OF REFERENCE

The primary objective of this Environmental Management Programme (EMPr) is to identify, manage, and mitigate any potential negative environmental impacts that may arise during the construction and post-construction phases of the proposed residential development and associated infrastructure. The EMPr serves as a guiding document to ensure that the construction and post-construction phases of the development are carried out in an environmentally responsible manner, in compliance with relevant legislation and best practices.

3.1. Scope of Application:

→ This EMPr applies to all construction and post-construction / operational activities associated with the proposed development, including site preparation, building construction, driveways, and any associated infrastructure.
→ It must be made available to all contractors, subcontractors, and relevant stakeholders involved in the project, ensuring that it forms an integral part of all tender documentation and contracts.

3.2. Binding Requirements:

→ The provisions of this EMPr are binding on the applicant/owner, all contractors, subcontractors, and any third parties acting on their behalf.
→ The applicant/owner is responsible for ensuring that all contractors and subcontractors are fully informed of the environmental requirements contained within this document.
→ Failure to comply with the requirements of this EMPr by any party involved in the construction will result in appropriate penalties, and the contractor will be obligated to remedy any environmental damage caused by their actions or the actions of their subcontractors.

3.3. Responsibilities and Accountability

→ The contractors are accountable for the environmental performance of the site and must ensure that all activities are conducted in accordance with the environmental standards and guidelines set out in the EMPr.
→ The contractors must also take proactive steps to prevent environmental damage and address any environmental issues that may arise during construction.
→ In the event of environmental harm or non-compliance, the contractors will be required to restore the affected areas and bear any costs associated with remediation or penalties imposed.

3.4. Implementation and Compliance Monitoring

→ Regular site inspections and audits will be conducted to monitor compliance with the EMPr. Any non-compliance will be recorded, and corrective actions will be mandated to mitigate environmental risks.
→ Contractors and subcontractors are required to cooperate fully during audits and inspections, and all personnel must receive appropriate environmental training to ensure adherence with the guidelines of this EMPr.
→ Monitor the bulk services, particularly the sewage system.

4. ENVIRONMENTAL CONTROL ON SITE

4.1. Approach

The Table below illustrates the various approaches to be undertaken to manage potential scenarios as a result of the activity on site:

Table 1: Impact management

Avoidance	Avoiding activities that could result in adverse impacts and/or resources or areas considered sensitive.
Prevention	Preventing the occurrence of negative environmental impacts and/or preventing such an occurrence having negative impacts.
Preservation	Preventing any future actions that might adversely affect an environmental resource.
Minimisation	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts through scaling down, relocating, redesigning and/or realigning elements of the project.
Mitigation	Measures taken to minimise adverse impacts on the environment.
Enhancement	Magnifying and/or improving the positive effects or benefits of a project.
Rehabilitation	Repairing affected resources, such as natural habitats or water resources.
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically, 'background' or 'pristine' condition. These resources may include soils and biodiversity.
Compensation	Compensating for lost resources, and where possible, the creation, enhancement or protection of the same type of resource at another suitable and acceptable location.

4.2. Organisational Structure and Responsibilities

All construction related staff are to be briefed on the requirements of the EA and EMPr and copies of these documents are to be kept on site during all phases of construction. Long term management will be required in the post construction / operational phase, and this will be done in conjunction with the Home Owners Association / Operators.

4.3. Environmental Control Officer

It is recommended that an ECO be appointed for the construction phase of the residential development. The upgrade of the existing access road and bulk services over the wetland, which is a particularly sensitive area, will require regular ECO site inspection. These should take place for the duration of the construction phase as per the conditions of the Environmental Authorisation. This will ensure that the additional conditions contained in the EA, EMPr and BAR are implemented.

It will be the ECO's responsibility to ensure that the mitigation / rehabilitation measures and recommendations referred to in the EA (still to be issued) are implemented and complied with by the owner.

The applicant (owner/holder) will be responsible for the remuneration of the ECO and any other expenses encountered in the process of environmental monitoring of the construction.

Roles and Responsibilities of an ECO

The responsibilities of the ECO during the construction and operational phase of the project, will include, but not be limited to, the following:

- → Ensure compliance with the EMPr at all times during the pre-construction and construction phase.
- → Ensure compliance with relevant management conditions of the EA during the preconstruction and construction phase.
- → Meet with the contractors to set out the environmental parameters within which they must work (pre-construction and construction phase).
- → To environmentally educate and raise the awareness of the Contractors and their staff and to target responsible individuals as key players for environmental education and to facilitate the spread of the correct environmental attitude during the contract work.
- → Approve the previously disturbed areas set out.
- → Indicate where all no-go areas, especially adjacent to the access road in the wetland, are to be demarcated and to ensure adherence to these delimitations at the induction session before any construction or site clearance commences on-site (pre-construction phase).
- → Inspect the construction footprint on a weekly basis during construction of these elements of the development; and must take immediate measures to address unforeseen disturbances.
- → Check the wetland for erosion damage and sedimentation weekly and after every heavy rainfall event.
- → Review method statements and to determine the most environmentally sensitive options.
- → Oversee the implementation of environmental procedures set out in this document.
- → Indicate where plant or animal (e.g. Dwarf Chameleon) rescue may be necessary, and what species should be rescued within the residential area (pre-construction phase).
- → Advise on rehabilitation/landscaping measures to be implemented.
- → Ensure that the correct earthworks practices are adhered to; (e.g. no encroachment into the surrounding vegetation, separation of topsoil and subsoil, correct stockpiling and stripping of topsoil).
- → Attend site contractor's meetings, as required and report on environmental issues.
- → Receive notices and minutes of all site meetings.
- → Maintain an open and direct channel of communication with the construction team and site manager.
- → Take immediate action on site where clearly defined no-go areas are violated, or in danger of being violated, and to inform the site manager immediately, of the documents and the action taken.
- → Keep an up-to-date record of works on site, as they relate to environmental issues in the site diary.
- → Be contactable by the public regarding matters of environmental concern during the construction phase.

The ECO is to submit a completion report to the competent authority (DEADP) and applicant upon completion of the construction phase and before the EA lapses.

4.4. Project Manager

In addition to the ECO, the Project Manager will be responsible for the following:

- → All activities relating to the construction phase.
- → Delegate activities in accordance with the EMPr.

- → Communicate design changes and technical issues to the team timeously.
- → Ensure that all contractors are managing their team adequately and abiding by the conditions of the EMPr and EA.
- → Ensuring that the Contractors are aware of the conditions of the EMPr and EA.

4.5. Contractor

The Contractor (including sub-contractors) will be responsible for:

- → Familiarising themselves with the EIA and EMPr.
- → Complying with the EMPr and EA commitments and any other legislative requirements as applicable.
- → Adhering to any instructions issued by the Project Manager or the Safety, Health and Environmental (SHE) Officer, if applicable.
- → Submitting an environmental report at designated site meetings on the environmental incidents that have occurred, if applicable.
- → Arranging that all employees and those of the subcontractors receive appropriate training prior to the commencement of construction, taking cognisance of this EMPr and EA.

4.6. Site Documentation and Reporting

A site logbook should be kept on a construction site for the purposes of recording on-site instructions and as a general record of environmental issues. The logbook should be kept for a minimum of two years after the activity is completed for the relevant authority to review if deemed necessary. A photographic record of before and after construction should also be kept for visual reference purposes. The logbook should also contain the following sections:

Environmental Site Instruction

The Environmental Site Instruction section will be used for the recording of general site instructions relating to the protection of environmentally sensitive or potentially impacted areas or features on the site as applicable, by the ECO / Site Manager / Construction team.

Monitoring Section

The purpose of this section will be to record the comments of the ECO / Site Manager / Contractor, during construction, relating to the implementation of the mitigation measures as well as waste, recycling, landscaping and renewable energy measures used during the construction. The findings of all inspections and internal audits should be structured into instructive reporting, providing information to all responsible personnel. Corrective actions must be clearly defined where required. Within the reporting function a structured review component will be enforced. This review function will assist in prescribing necessary corrective actions. During construction, the ECO / Project management team, will be responsible for onsite monitoring to ensure that the contractor abides by the conditions of the EA and EMPr.

The Environmental Authorisation (EA) as well as a copy of the approved Environmental Management Programme (EMPr) for Construction, should also be accessible on site at all times.

4.7. Homeowners Association

A Homeowners Association (HOA) or similar structure is required to implement and oversee the long-term management actions required on site.

5. CONDITIONS OF AUTHORISATION

The Environmental Authorisation (EA), once issued, will be included here and will be mandatory for all contractors, sub-contractors, agents, consultants, and construction personnel working on the property.

6. ENVIRONMENTAL AWARENESS

It is important to ensure that the contractors and employees associated with the proposed activity receive the appropriate level of training and awareness to ensure that continual environmental due diligence and conservation is applied at all levels of work carried out on site. Employees, contractors and sub-contractors must be made aware of their responsibilities in terms of relevant legislation, guidelines, as well as this EMPr and EA.

The environmental conditions should be included in the contracts issued to the contractors, making them aware of the potential environmental impacts and risks associated with the proposed development as well as what measures are expected of them whilst conducting work on site. The importance of implementing the conditions in the EMPr and the necessity of good housekeeping practices, will be made known to the contractors and employees.

6.1. Aim of the Environmental Awareness Plan

- → Promote environmental education and conservation on site.
- → Inform employees and contractors on the applicable environmental procedures and plans.

6.2. Environmental Awareness Training and content

- → All personnel should undergo induction, which as a minimum, should include Safety, Health and Environmental awareness.
- → All attendees should sign an acknowledgement register upon receiving and understanding the induction.
- → Construction and operational staff should be trained on the implementation of emergency procedures where applicable.
- → Definitions as used in this EMPr should be provided.
- → How and why environmental protection is necessary, should be explained.
- → Management measures required to prevent environmental impacts should be outlined.
- → Emergency and spills response procedures should be outlined.

Environmental conditions in the induction should focus on the following:

- → Good house-keeping practices
- → Air quality (Dust)
- → Waste Management
- → Odour/vermin Control
- → Proper use of sanitation facilities; and
- → Chemicals and materials storage, use and handling.

Environmental training should be implemented at the onset of the construction and can be done verbally or in written format. Proof of training should be kept on record.

7. CONSTRUCTION PHASE IMPACTS AND MITIGATIONS

7.1 Aquatic Biodiversity Impacts

The Aquatic Biodiversity Assessment identified the following key potential impacts as well as mitigations measures for the management of impacts on aquatic ecosystems during the construction phase and the upgrade of the road and bulk infrastructure in the road reserve:

***Potential impacts**:*

- → Potential wetland habitat disturbance as a result of the road upgrade, installation of services for the proposed residential development, and maintenance activities
- → Alteration of the flow regime of the UVB wetland during construction and operation of the residential development / upgrade of the road/services installation, and associated erosion within the watercourse. Flow alteration may occur due to potential flow diversion / impediment / increase in storm flows.
- → Water quality impairment due to increased sediment input, potential spillage, or release of potentially contaminated runoff into the UVB wetland during construction of the residential housing and upgrade of the road/services installation. Additionally, during operation, water quality impairment may occur due to the release of potentially contaminated stormwater (potentially polluted with hydrocarbons) or leakage from sewage pipes into the UVB wetland.

Management of Impacts and Mitigation measures:

Disturbance of Wetland Habitat

- → The extent of works within the UVBW should be limited as far as possible (both in terms of extent and duration and should be within the road reserve area).
- → Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable).
- → Locate site camps, laydown areas, stockpile areas, construction material, equipment storage areas, vehicle parking areas, bunded vehicle servicing areas and re-fuelling areas in designated areas of already hardened surface or disturbed areas located outside of the No Go area. These areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO). Cut and fill must be avoided where possible during the set-up of the construction site camp.
- → Demarcation of the construction footprint/working servitude must be signed off by an ECO (or similar). Demarcation should not be removed until construction is complete, and rehabilitation (if applicable) has taken place.
- → Prohibit the dumping of excavated material, building materials or removed vegetation within the No Go area. Building material must be stored at the designated storage area located outside of the no-go area. Spoil material must be appropriately disposed of at a registered waste disposal facility.
- → Undisturbed topsoil and subsoils removed from the construction footprint must be stored separately at the designated stockpile area for future rehabilitation.
- → Vegetation clearance should be restricted to the relevant development components and indigenous vegetation cover should be maintained as far as practically possible.

- → Vegetation which is considered suitable for rehabilitation activities after construction (such as indigenous grasses and other herbaceous species) should be carefully removed from the construction footprint and stored at an appropriate facility for use in later rehabilitation activities (as applicable).
- → Clear and remove any rubble or litter that may have been accidentally deposited into the no-go area because of construction activities and dispose of at an appropriate registered facility.
- → An ECO must inspect the construction footprint of the road upgrade on a weekly basis and must take immediate measures to address unforeseen disturbances to the wetland. Any disturbed / compacted areas falling outside of the demarcated construction footprint must be immediately rehabilitated. Depending on the extent of damage the method of rehabilitation may require input from an aquatic specialist / suitably qualified contractor.
- → Once construction has been completed, orange hazard fences as well as all construction waste, rubble, and equipment must be removed from the construction footprint.
- → In line with the NEMBA, all AIPS listed under the amended AIPS Lists (DEFF: GN1003, 2020) must either be removed or controlled on land under the management of the proponent.
- → Vegetation which needs to be re-planted (if applicable) within each erf should be planted with indigenous vegetation.
- → A Rehabilitation, Maintenance and Management Plan must be drafted by a suitably qualified specialist.

Altered flow regime

- → Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable).
- → Should flow need to be impeded or diverted temporarily within the watercourse while works are being undertaken, it is recommended that the diversion be undertaken during the dry season and that the flow be piped past the works and discharged into the watercourse immediately downstream of the works. The diversion should be kept to a minimum period and should be mitigated to ensure that no sedimentation or erosion is resulting downstream.
- → Natural water flow within the UVBW must be maintained. Multiple culverts or open-bottom structures to maintain sheet flow is recommended as well as permeable shoulders or subgrades to allow natural infiltration of water into wetland soils where and as applicable.
- → The works within the UVBW should (where possible) take place during the drier months of the year (October to May) when there would be minimised impact in terms of flow and water quality. Where construction during the wet period cannot be avoided, it is recommended that the proposed method statement be compiled for undertaking the works during higher flows that specifically address limiting contamination and sediment at the site from impacting downstream aquatic habitat.
- → Ensure that effective stormwater management measures are implemented during construction, particularly associated with runoff from the road. Stormwater management must ensure that no runoff, which will impair the water quality and lead to increased sedimentation, may enter the downstream wetland area. Additionally, clean SW which does enter the downstream wetland system should do so in a manner that ensures no erosion occurs specifically during storm events, such as through vegetated swales.
- → Stormwater systems will require ongoing maintenance. Any build-up of silt or debris within stormwater drains or swales will need to be cleared to ensure the continued functioning of the systems.
- → Any damage to stormwater infrastructure, and any flaws identified in the functionality of stormwater infrastructure, must be rectified immediately.

- → Silt fencing and/or sediment basins should be installed prior to construction activities, in areas prone to sedimentation/erosion, to trap sediments and attenuate runoff into wetlands.
- → Implement erosion control measures where required. Examples of erosion control measures include:
    - o Covering steep/unstable/erosion prone areas with geotextiles.
    - o Covering areas prone to erosion with brush packing, straw bales, mulch.
    - o Stabilizing cleared/disturbed areas susceptible to erosion with sandbags.
    - o Constructing silt fences / traps in areas prone to erosion, to retain sediment-laden runoff. Silt fences must be adequately maintained. Furthermore, the ECO / site manager must monitor sediment fences / traps after every heavy rainfall event and any sediment that has accumulated must be removed by hand.
- → Rainwater harvesting schemes (for the residential development) may reduce runoff intensity and thereby mitigate the impact of catchment hardening.
- → The alien invasive vegetation present within the wetland area must be removed and replanted with indigenous wetland vegetation.
- → A Rehabilitation, Maintenance and Management Plan must be drafted by a suitably qualified specialist.

Water Quality Impairment

- → The extent of works within the UVBW should be limited as far as possible (both in terms of extent and duration and should be within the road reserve area).
- → Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable).
- → The works within the UVBW should (where possible) take place during the drier months of the year (October to May) when there would be minimised impact in terms of flow and water quality. Where construction during the wet period cannot be avoided, it is recommended that the proposed method statement be compiled for undertaking the works during higher flows that specifically address limiting contamination and sediment at the site from impacting downstream aquatic habitat.
- → Ensure that effective stormwater management measures are implemented during construction, particularly associated with runoff from the road. Stormwater management must ensure that no runoff, which will impair the water quality and lead to increased sedimentation, may enter the downstream wetland area. Additionally, clean SW which does enter the downstream wetland system should do so in a manner that ensures no erosion occurs specifically during storm events, such as through vegetated swales.
- → Silt fencing and/or sediment basins should be installed prior to construction activities, in areas prone to sedimentation/erosion, to trap sediments and prevent runoff into wetlands.
- → The site manager / ECO must check the No Go area for pollution/spills, erosion damage and sedimentation weekly and after every heavy rainfall event. Should pollution, erosion or sedimentation be noted, immediate corrective measures must be undertaken.
- → Fuel, chemicals, and other hazardous substances should preferably be stored offsite, or as far away as possible from the no-go area. These substances must be stored in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding, or storm damage.
- → Inspect all storage facilities, vehicles, and machinery daily for the early detection of deterioration or leaks and strictly prohibit the use of any vehicles or machinery from which leakage has been detected.
- → Mixing and transferring of chemicals or hazardous substances must take place outside of the No Go area, and must take place on drip trays, shutter boards or other impermeable surfaces.

- → Drip trays must be utilised at all fuel dispensing areas; and during the maintenance of existing sewer flow as possible.
- → Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site it must only take place within designated areas outside of the No Go area and should only occur on bunded areas with a water/oil/grease separator.
- → Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site.
- → Avoid the use of infill material or construction material with pollution / leaching potential. Where possible, in situ earthen materials must be used during construction to reduce the risk of leachate from imported materials contaminating the wetland area.
- → Concrete should preferably be imported as "ready-mix" concrete from a local supplier. Should onsite concrete mixing be required it must not be done on exposed soils. Concrete must be mixed on an impermeable surface in an area of low environmental sensitivity identified by the ECO outside of the no-go area. Surplus or waste concrete must be sent back to the supplier who will dispose of it.
- → Construct temporary bunds around areas where cement is to be cast in situ.
- → Dispose of concrete and cement-related mortars in an environmental sensitive manner (can be toxic to aquatic life). Disposal of any of these waste materials into the No Go area is strictly prohibited.
- → Washout must not be discharged into the no-go area. A washout area should be designated, and wash water should be treated on-site.
- → Clean up any spillages immediately with the use of a chemical spill kit and dispose of contaminated material at an appropriately registered facility.
- → Provide portable toilets where work is being undertaken (1 toilet per 10 workers). These toilets must be located within an area designated by the ECO outside of the no-go area and should preferably be located on level ground. Portable toilets must be regularly serviced and maintained.
- → Provide an adequate number of bins on site and encourage construction personnel to dispose of their waste responsibly.
- → Waste generated by construction personnel must be removed from the site and disposed of at a registered waste disposal facility on a weekly basis.
- → Design a SWMP which will allow for the infiltration and treatment of stormwater. All stormwaters must receive basic filtering and treatment prior to its release.
- → Incorporate measures into the stormwater design to trap solid waste, debris and sediment carried by stormwater. Measures may include the use of curb inlet drain grates and debris baskets/bags.
- → Stormwater generated from areas with a higher risk of contamination such as parking areas and roads (as applicable) must receive basic filtering and treatment prior to its release into surrounding areas.
- → Stormwater systems must be monitored and maintained into perpetuity and collections of debris and solid waste removed from grates and baskets.
- → Operational phase mitigation implemented during the design/construction phase:
    - Construct sewage pipelines in accordance with the relevant SANS / SABS specifications.
    - Design the pipelines to accommodate the operating and surge pressures.
    - Provide surge protection e.g. air valves.
    - Allow for scour valves along pipelines to ensure sewage pipelines can be emptied in a controlled manner if required.
    - Allow for surcharge containment and emergency storage of 2 hours of peak flow at manholes located within areas upslope of the wetland. Containment/emergency storage may include a concrete box or earthen bund surrounding the manholes. The backup storage capacity of manholes may also be improved by raising the manholes by one meter.
- → The sewage system must be monitored and maintained into perpetuity. The developer must confirm who will be responsible for this monitoring and maintenance as well as their roles.

→ These measures should be addressed, implemented and monitored in terms of the Environmental Management Programme for the construction phase.

Table 2. Activity specific impacts and mitigations

PRE-CONSTRUCTION/ CONSTRUCTION PHASE AND POST-CONSTRUCTION PHASE			
IMPACT	**DESCRIPTION**	**MITIGATION MEASURES**	**RESPONSIBLE PERSONS**
Disturbance of Wetland Habitat	Disturbance of wetland habitat within the UVBW may occur due to the proximity of the proposed residential development, as well as the upgrade of the existing access road and installation of sewer / water supply pipelines, including but not limited to vegetation clearing, infilling, and construction of the road and housing. The disturbance of aquatic habitat will also provide an opportunity for alien invasive species (AIS) to proliferate. During the operational phase, foot traffic, along with littering and dumping in the wetland area may result in disturbance of wetland habitat.	- The extent of works within the UVBW should be limited as far as possible (both in terms of extent and duration and should be within the road reserve area). - Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable). - Locate site camps, laydown areas, stockpile areas, construction material, equipment storage areas, vehicle parking areas, bunded vehicle servicing areas and re-fuelling areas in designated areas of already hardened surface or disturbed areas located outside of the No Go area. These areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO). Cut and fill must be avoided where possible during the set-up of the construction site camp. - Demarcation of the construction footprint/working servitude must be signed off by an ECO (or similar). Demarcation should not be removed until construction is complete, and rehabilitation (if applicable) has taken place. - Prohibit the dumping of excavated material, building materials or removed vegetation within the No Go area. Building material must be stored at the designated storage area located outside of the no-go area. Spoil material must be appropriately disposed of at a registered waste disposal facility.	Applicant Engineer Contractor ECO

		- Undisturbed topsoil and subsoils removed from the construction footprint must be stored separately at the designated stockpile area for future rehabilitation. - Vegetation clearance should be restricted to the relevant development components and indigenous vegetation cover should be maintained as far as practically possible. - Vegetation which is considered suitable for rehabilitation activities after construction (such as indigenous grasses and other herbaceous species) should be carefully removed from the construction footprint and stored at an appropriate facility for use in later rehabilitation activities (as applicable). - Clear and remove any rubble or litter that may have been accidentally deposited into the no-go area because of construction activities and dispose of at an appropriate registered facility. - An ECO must inspect the construction footprint of the road upgrade on a weekly basis and must take immediate measures to address unforeseen disturbances to the wetland. Any disturbed / compacted areas falling outside of the demarcated construction footprint must be immediately rehabilitated. Depending on the extent of damage the method of rehabilitation may require input from an aquatic specialist / suitably qualified contractor. - Once construction has been completed, orange hazard fences as well as all construction waste, rubble, and equipment must be removed from the construction footprint. - In line with the NEMBA, all AIPS listed under the amended AIPS Lists (DEFF: GN1003, 2020) must either be removed or controlled on land under the management of the proponent. - Vegetation which needs to be re-planted (if applicable) should be planted with indigenous vegetation. - A Rehabilitation, Maintenance and Management Plan must be drafted by a suitably qualified specialist.	
Altered flow regime	Site clearance, infilling, and compaction will result in alteration of the flow regime of wetland area on the site. The hardened catchment area would result in increased stormwater runoff, velocity and increased flood peaks within the wetland and would also likely result in sedimentation and erosion.	- Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable).	Applicant Contractor ECO

	Given that the wetland's hydrological status quo is seriously modified, should multiple culverts, etc. be constructed during the road upgrade, there will more likely be positive impacts associated with the road upgrade in this respect (increased hydrological connectivity).	- Should flow need to be impeded or diverted temporarily within the watercourse while works are being undertaken, it is recommended that the diversion be undertaken during the dry season and that the flow be piped past the works and discharged into the watercourse immediately downstream of the works. The diversion should be kept to a minimum period and should be mitigated to ensure that no sedimentation or erosion is resulting downstream. - Natural water flow within the UVBW must be maintained. Multiple culverts or open-bottom structures to maintain sheet flow is recommended as well as permeable shoulders or subgrades to allow natural infiltration of water into wetland soils where and as applicable. - The works within the UVBW should (where possible) take place during the drier months of the year (October to May) when there would be minimised impact in terms of flow and water quality. Where construction during the wet period cannot be avoided, it is recommended that the proposed method statement be compiled for undertaking the works during higher flows that specifically address limiting contamination and sediment at the site from impacting downstream aquatic habitat. - Ensure that effective stormwater management measures are implemented during construction, particularly associated with runoff from the road. Stormwater management must ensure that no runoff, which will impair the water quality and lead to increased sedimentation, may enter the downstream wetland area. Additionally, clean SW which does enter the downstream wetland system should do so in a manner that ensures no erosion occurs specifically during storm events, such as through vegetated swales. - Stormwater systems will require ongoing maintenance. Any build-up of silt or debris within stormwater drains or swales will need to be cleared to ensure the continued functioning of the systems. - Any damage to stormwater infrastructure, and any flaws identified in the functionality of stormwater infrastructure, must be rectified immediately. - Silt fencing and/or sediment basins should be installed prior to construction activities, in areas prone to sedimentation/erosion, to trap sediments and prevent runoff into wetlands. - Implement erosion control measures where required. Examples of erosion control measures include:	

		○ Covering steep/unstable/erosion prone areas with geotextiles. ○ Covering areas prone to erosion with brush packing, straw bales, mulch. ○ Stabilizing cleared/disturbed areas susceptible to erosion with sandbags. ○ Constructing silt fences / traps in areas prone to erosion, to retain sediment-laden runoff. Silt fences must be adequately maintained. Furthermore, the ECO / site manager must monitor sediment fences / traps after every heavy rainfall event and any sediment that has accumulated must be removed by hand. - Rainwater harvesting schemes (for the residential development) may reduce runoff intensity and thereby mitigate the impact of catchment hardening. - The alien invasive vegetation present within the wetland area must be removed and replanted with indigenous wetland vegetation. - A Rehabilitation, Maintenance and Management Plan must be drafted by a suitably qualified specialist.	
Water quality impairment	Accidentally spilled cement, construction chemicals, sewage during the upgrade/installation of pipelines, or petrochemicals from construction vehicles may find their way into the wetland area. Additionally, litter and dumping may occur due to the proximity of the proposed development to the wetland area. The removal of vegetation and stripping of soils from the construction footprint will result in the exposure of soils to erosive elements. An increase in stormwater runoff and velocities from exposed and compacted areas, particularly during peak rainfall periods, may result in the formation of erosion gullies and rills in the downslope wetland. In addition, destabilisation of soils during the removal of vegetation and excavation activities, as well as the stockpiling of soils may result in an increase	- The extent of works within the UVBW should be limited as far as possible (both in terms of extent and duration and should be within the road reserve area). - Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable). - The works within the UVBW should (where possible) take place during the drier months of the year (October to May) when there would be minimised impact in terms of flow and water quality. Where construction during the wet period cannot be avoided, it is recommended that the proposed method statement be compiled for undertaking the works during higher flows that specifically address limiting contamination and sediment at the site from impacting downstream aquatic habitat.	Applicant Contractor ECO

	in the runoff of sediment laden stormwater into the downslope wetland from the construction footprint, particularly during the rainy season. During operation, pollutants may enter the wetland via stormwater or sewage leaks (although highly unlikely). However, with the inclusion of stormwater design measures which allow for the infiltration and treatment of stormwater this impact can be greatly reduced.	- Ensure that effective stormwater management measures are implemented during construction, particularly associated with runoff from the road. Stormwater management must ensure that no runoff, which will impair the water quality and lead to increased sedimentation, may enter the downstream wetland area. Additionally, clean SW which does enter the downstream wetland system should do so in a manner that ensures no erosion occurs specifically during storm events, such as through vegetated swales. - Silt fencing and/or sediment basins should be installed prior to construction activities, in areas prone to sedimentation/erosion, to trap sediments and prevent runoff into wetlands. - The site manager / ECO must check the No Go area for pollution/spills, erosion damage and sedimentation weekly and after every heavy rainfall event. Should pollution, erosion or sedimentation be noted, immediate corrective measures must be undertaken. - Fuel, chemicals, and other hazardous substances should preferably be stored offsite, or as far away as possible from the no-go area. These substances must be stored in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding, or storm damage. - Inspect all storage facilities, vehicles, and machinery daily for the early detection of deterioration or leaks and strictly prohibit the use of any vehicles or machinery from which leakage has been detected. - Mixing and transferring of chemicals or hazardous substances must take place outside of the No Go area, and must take place on drip trays, shutter boards or other impermeable surfaces. - Drip trays must be utilised at all fuel dispensing areas; and during the maintenance of existing sewer flow as possible. - Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site it must only take place within designated areas outside of the No Go area and should only occur on bunded areas with a water/oil/grease separator. - Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site. - Avoid the use of infill material or construction material with pollution / leaching potential. Where possible, in situ earthen materials must be used during construction to reduce the risk of leachate from imported materials contaminating the wetland area.	

		- Concrete should preferably be imported as “ready-mix” concrete from a local supplier. Should onsite concrete mixing be required it must not be done on exposed soils. Concrete must be mixed on an impermeable surface in an area of low environmental sensitivity identified by the ECO outside of the no-go area. Surplus or waste concrete must be sent back to the supplier who will dispose of it. - Construct temporary bunds around areas where cement is to be cast in situ. - Dispose of concrete and cement-related mortars in an environmental sensitive manner (can be toxic to aquatic life). Disposal of any of these waste materials into the No Go area is strictly prohibited. - Washout must not be discharged into the no-go area. A washout area should be designated, and wash water should be treated on-site. - Clean up any spillages immediately with the use of a chemical spill kit and dispose of contaminated material at an appropriately registered facility. - Provide portable toilets where work is being undertaken (1 toilet per 10 workers). These toilets must be located within an area designated by the ECO outside of the no-go area and should preferably be located on level ground. Portable toilets must be regularly serviced and maintained. - Provide an adequate number of bins on site and encourage construction personnel to dispose of their waste responsibly. - Waste generated by construction personnel must be removed from the site and disposed of at a registered waste disposal facility on a weekly basis. - Design a SWMP which will allow for the infiltration and treatment of stormwater. All stormwaters must receive basic filtering and treatment prior to its release. - Incorporate measures into the stormwater design to trap solid waste, debris and sediment carried by stormwater. Measures may include the use of curb inlet drain grates and debris baskets/bags. - Stormwater generated from areas with a higher risk of contamination such as parking areas and roads (as applicable) must receive basic filtering and treatment prior to its release into surrounding areas.	

		- Stormwater systems must be monitored and maintained into perpetuity and collections of debris and solid waste removed from grates and baskets.
		- Operational phase mitigation implemented during the design/construction phase:
		  o Construct sewage pipelines in accordance with the relevant SANS / SABS specifications.
		  o Design the pipelines to accommodate the operating and surge pressures.
		  o Provide surge protection e.g. air valves.
		  o Allow for scour valves along pipelines to ensure sewage pipelines can be emptied in a controlled manner if required.
		  o Allow for surcharge containment and emergency storage of 2 hours of peak flow at manholes located within areas upslope of the wetland. Containment/emergency storage may include a concrete box or earthen bund surrounding the manholes. The backup storage capacity of manholes may also be improved by raising the manholes by one meter.
		- The sewage system must be monitored and maintained into perpetuity. The developer must confirm who will be responsible for this monitoring and maintenance as well as their roles.
		- These measures should be addressed, implemented and monitored in terms of the Environmental Management Programme for the construction phase.	

Dust	*Construction* Dust generated from site clearing and site preparation *Post-construction*	- Maintain ground cover for as long as possible to reduce the total surface area exposed to wind. Do not clear entire plots and rather clear building footprint only - Ensure vehicle speed limits on site are kept to a minimum. - Delivery vehicles to keep loads covered. - Cover fine material stockpiles. - Wet dry and dusty surfaces using non-potable water if possible. - Staff to wear correct PPE if dust is generated for long periods. - Road surfaces to be swept and kept clean of sand and fine materials	ECO, Contractor Applicant
Noise	*Construction*	- Limit noise levels (e.g. install and maintain silencers on machinery). - Provide protective wear for workers i.e. ear plugs.	ECO, Contractor Applicant

	Noise generated from vehicles and machinery during the construction phase.	- Ensure that construction vehicles and machinery are maintained regularly to reduce noise generation. - Restrict construction to normal working hours	
Visual impacts	*Construction* Visual impacts of construction site and construction activities.	- Good housekeeping of construction site and working areas. - Screen the visual elements of the site camp with netting. - Locate the site camp in a transformed area. - Site officer to walk the site on a daily basis to check for visual impacts and general site aesthetics, particularly prior to weekends and holidays - Officer to ensure that waste and batching areas are correctly screened and secured to prevent spread by wind, rain or animals. - Implement landscaping strategies to minimize the visual impact of construction and operational activities. - Incorporate green design principles into the development to enhance aesthetics and mitigate negative visual effects. - Communicate with the community to ensure understanding and acceptance of the changes in the visual character. - Consider the use of native vegetation in landscaping to maintain a natural feel and reduce visual disruptions.	ECO, Contractor Applicant
Socioeconomic impacts	*Construction* Job creation during the development /construction phase of the Erven *Post-construction* Access to employment for the community during the operational phase, Job creation, Provision of residential erven in response to provincial demand, investment in the area.	- Ensure labour force is sourced locally as far as possible.	ECO, Contractor, Applicant

8 GENERAL CONSTRUCTION PHASE IMPACTS AND REQUIREMENTS

8.1 Contractors camp

Responsibility – Contractor / ECO / Owner

- → The contractor shall comply will all relevant laws, by-laws and regulations concerning water provision, sanitation, wastewater discharge and liquid and solid waste handling and disposal during the construction phase.
- → The contractor is referred to the requirements of the NEMA and the NEM:WA and related regulations.
- → The contractor shall not locate the camp, or sanitation facilities, in any areas that can cause nuisance or safety hazards to surrounding land users, inhabitants or the general public.
- → Suitable temporary toilet facilities should be provided to the construction team. These facilities should be emptied and cleaned on a regular basis by a registered contractor and the waste is to be removed by contractor to a registered facility.
- → The contractor shall at all times carefully consider the machinery required for the desired task while minimizing the extent of environmental damage.
- → The contractor shall keep construction campsites clean and tidy at all times.
- → The contractor shall **not** leave domestic waste uncontained, and temporary storage shall be enclosed to keep out people and animals.
- → All domestic refuse is to be removed to an existing licensed landfill site.
- → The contractor shall take specific measures to prevent the spread of veld fires, which may be caused by activities at the camp. These measures may include appropriate instruction of employees about the fire risks and the construction of firebreaks around the site perimeter, as required. Adequate firefighting equipment shall be made available and maintained on site.
- → The contractor shall prevent accelerated erosion from the construction campsite and shall not discharge polluted runoff into the environment.
- → The contractors camp should be located in area proposed for development, in order to reduce impacting undisturbed areas.
- → No overnighting will be permitted at the contractors' camp, unless specifically arranged or required. Decommissioning of the campsite will involve removal of all compacted platforms, equipment machinery, tools, waste, etc.

8.2 Health and Safety

Responsibility - Project Manager / Contractor / ECO / Owner

- → The applicant will appoint one safety officer for the activities.
- → Correct Personal Protective Equipment (PPE) must be worn at all times by the personnel on site. Personnel must be trained on the use of PPE.
- → Suitable warning and information signage should be erected at the commencement of construction. The handling of hazardous materials should only be done by trained personnel. Safety Data Sheets (SDSs) must be readily available for all hazardous substances on site and employees should be aware of the risks associated with any hazardous materials used.
- → All provisions of the Occupational Health and Safety Act (Act No. 85 of 1993) must be complied with. In the event of an emergency relating to a hazardous substance, procedures detailed in the SDSs should be immediately implemented.

8.3 Fire risk management

Responsibility - Project Manager / Contractor / ECO / Owner

The Applicant / Project manager / Contractor should identify a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Fire Officer shall ensure that there is basic fire-fighting equipment available on site at all times. Any fires should be reported to the fire officer immediately.

8.4 Fuels and hazardous materials

Responsibility - Project Manager / Contractor / Owner

Fuels and flammable materials are to be suitably stored, inside the contractor's camp or as appropriate. Impervious materials are to be used in these storage areas to prevent contamination of the ground in the event of spillages or leaks. Quantities of fuels and hazardous materials stored on site should be appropriate to the requirement for these substances on site.

Bulk fuel depots, if required, should be placed within bunded areas to prevent soil contamination in the event of leaks of spills. Bunded areas are to have a holding capacity equal to 110% of the largest fuel container. The relevant Health and Safety requirements for the hazardous materials and fuels should be kept on site in the event of an emergency.

8.5 Emergencies protocol

Responsibility - Project Manager / Contractor / Owner

Fire: The fire officer / suitable other person should be notified of any fires. Employees should be aware of the procedure to be followed in the event of a fire.

Hydrocarbon (fuel & oil) leaks and spillages: Employees should be aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the project manager / contractor. All vehicles leaking fuel or other liquids should immediately be removed to the maintenance area and repaired. In the event of a hydrocarbon spillage, the soil must be excavated and treated and adequately disposed. The necessary materials and equipment for dealing with spills and leaks are present on site at all times. The clean-up of sewerage spills and any damage caused by the spill or leak shall be for the applicant's account. The applicant shall ensure that the Health and Safety officer is available for the duration of the construction period.

Raw Sewerage spills (from portable toilets): Employees are to be aware of the procedure to be followed for dealing with spills and leaks. All the necessary materials and equipment for dealing with spills and leaks are present on site at all times. The clean-up of sewerage spills and any damage caused by the spill or leak shall be for the Applicant's account or applicable contractor.

Sudden illness in member of team: emergency numbers should be readily available on site in case of a sudden illness or injury to a construction team member.

Snake bite: Emergency contact numbers must be kept on site in case of a snake siting or snakebite.

8.6 Site Demarcation

Responsibility - Project Manager / Contractor / ECO / Owner

Prior to any construction commencing, the boundaries of the site and / or the footprints of each dwelling should be appropriately indicated or fenced off by the contractor. Natural / Open Space areas that should be retained

should also be indicated at this stage. Following this, all construction works, as well as the storage or preparation of any materials must be within the demarcated boundaries of the construction zone. No Go areas are to also be demarcated at this stage. The permanent delineated wetland must be clearly demarcated and made a no-go area, this should apply to the temporary wetland zones too, as far as possible.

8.7 Stockpiles

Responsibility - Project Manager / Contractor / ECO / Owner

The contractor and / or project manager should identify sites for the stockpiling of building materials and excavated material. Stockpile sites should preferably be in areas with a gentle gradient. Stockpiles should be stabilised as required and monitored for dust blow and runoff / erosion.

8.8 General Wastes

Responsibility - Project Manager / Contractor / ECO / Owner

Refuse refers to all construction debris (cement bags, rubble, timber, cans, nails, wire, spilt bitumen, glass, packaging, plastic, organic matter, etc.). Refuse generated during the construction phase should be stored in an appropriate area on site, should be water tight and wind proof, and removed on a regular basis for disposal at a permitted disposal site. Waste bins should be labelled for their designated use. No burning or burying of general refuse on site should be permitted. Recycling and sorting of waste, at the source, is encouraged. Disposal certificates should be kept.

8.9 Recreational / Eating areas

Responsibility - Project Manager / Contractor / ECO / Owner

If construction workers are permitted to eat on the development site, other than within the contractor's camp, the Contractor shall provide adequate refuse bins at all such places and ensure that they are used. Bins are to be cleared on a daily basis. No rest areas are to be permitted in No Go areas.

8.10 Construction water

Responsibility - Project Manager / Contractor / ECO / Owner

All cement effluent from mixer washings and run-off from batching areas, equipment washout, as well as other work areas, should be contained in suitable manner, these areas should be lined and allowed to dry from time to time in order to remove the solid materials. Care should be taken to prevent the runoff of construction water, to other areas on site or onto adjacent sites.

8.11 Equipment maintenance

Responsibility - Project Manager / Contractor / ECO / Owner

All mechanical equipment and work vehicles which are present on-site during construction, are to be stored, serviced and refuelled only at designated areas or within the contractor's camp. Within these areas drip trays and other impervious materials, for example plastic or metal sheeting, must be used to prevent contamination of the ground. The project manager may order the removal of equipment that is causing continual environmental damage, until such equipment has been repaired.

8.12 Stormwater Management

Responsibility - Project Manager / Contractor / ECO / Owner

Stormwater should be monitored regularly to ensure no environmental risk or unmanageable load to the existing infrastructure. The contractor must take suitable measures to prevent erosion resulting from a diversion, restriction or increase in flow of stormwater caused by construction. The open space erf may be used for stormwater retention.

8.13 Topsoil Removal and Stockpiling

Responsibility - Project Manager / Contractor / ECO / Owner

Where services are to be extended or houses erected, topsoil is to be removed from the work areas, stockpiled separately from subsoil, and must be stabilised within a day of stockpiling. In general, stockpiles should be convex at the top to promote run- off, so that water is not able to accumulate and result in leaching of nutrients from the soil. Stockpiling areas should be determined in consultation with the ECO and only for short term.

8.14 Erosion Control

Responsibility - Project Manager / Contractor / ECO / Owner

Action should be taken to prevent erosion of soils on the construction site. Should any erosion be detected on site, the cause of such erosion should be identified, and appropriate remedial action must be immediately implemented.

8.15 Dust Control

Responsibility - Project Manager / Contractor / ECO / Owner

Appropriate action should be taken to minimise the generation of dust on the site. This can be done by applying appropriate stabilisation materials, such as straw or mulch or watering of exposed areas. Suppression methods not involving water, are preferred as far as possible.

8.16 Construction Traffic Management

Responsibility - Project Manager / Contractor / ECO / Owner

All construction vehicles which carry construction materials, must use sheeting or a suitable cover, to prevent loss of load during travelling or due to wind or rain. Any spills should be cleaned immediately.

8.17 Architecture / Design

Responsibility - Project Manager / Contractor / ECO / Owner

The architecture and design of the dwellings will be done in line with the general trend of the area and comply with the Town Planning Scheme. The houses should be designed to be in line with the surrounding architecture and/or cape vernacular style common to the area. Neutral colour palettes should be used which blend into the surrounds.

8.18 Sustainable Building Guidelines and materials

Responsibility - Project Manager / Contractor / ECO / owner

The houses should be designed in such a way as to create a sustainable living area. Ensure materials and orientation allow for an environmentally friendly design with lower operating costs, i.e. natural ventilation, correct orientation, correct colours and roofing etc. Use recycled materials as far as possible.

Energy efficiency is also an important, and the following actions should be considered:

- → North orientation to ensure that as many well-used spaces face north as possible. Sun control is more difficult on East and West facing windows.
- → Use of good insulation in the roof and walls to keep the inside temperature warm in winter or cool in summer.
- → Solar water heaters to be included in the design phase.
- → Suitable roof overhangs to let in the lower winter sun but provide shade from the summer sun.
- → Sensible fenestration – let in the light and catch the winter sun, but not too much window area so that warmth or cool cannot be retained inside when needed. They can be combined with shading and reflecting devices - such as overhangs, screens, shutters, awnings, trees, planting and different glass types which will aid to control the amount, quality and time of daylight entering the building.
- → Suitable ventilation for fresh air and cool breezes.
- → Natural lighting through windows and light wells.

Water conservation should be a priority in design of the dwelling. Rainwater tanks are recommended as far as possible. Highly efficient dual flushing toilet design must be installed. Low flow shower and heads systems should be fitted. Aerators on taps should also be fitted to reduce overall water demand. Optimally designed systems for grey water reuse should also be explored during the design phase in order to prevent the expense of retrofitting a system. Water wise and indigenous landscaping is recommended and will reduce the water costs associated with maintaining gardens. Permeable paving is to be used in areas where paving is required.

Construction activities such as watering, mixing and cleaning should avoid water wastage. Dry brushing and trigger spray nozzles should be used. Reuse of construction water should also be implemented.

8.19 Site Clean Up and Rehabilitation

Responsibility - Project Manager / Contractor / ECO/ Owner

The following actions should be implemented once construction has concluded:

- → The construction footprint should be restored to the natural contours of the ground and shall allow normal surface drainage, as far as possible.
- → No foreign matter such as rubble, waste or hazardous material will be mixed with the topsoil or used to backfill excavation.
- → All temporary works within the construction footprint, including fences, access, roads etc. disturbed by construction, should be restored to their original condition, as far as practical.
- → Compacted soils within the construction footprint should be loosened by means of a plough or scarified to aid revegetation.
- → Runoff and erosion, as a result of the construction phase, should be suitably managed to prevent long term impacts.
- → All structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed.
- → Vegetation cover (using species appropriate to the local area) in all areas disturbed by the works should be reintroduced, as required.

9 COMPLIANCE AND MONITORING

Non-compliance

The Environmental Authorisation (EA) stipulates that, *"Non-compliance with a condition of this Environmental Authorisation and the EMP may render the holder liable to criminal prosecution."* It is therefore important that the conditions are adhered to as outlined in the EA and EMPr. A penalties scheme can be used during construction for transgressions.

Transgressions relate to actions by the contractor whereby damage or harm is inflicted upon the environment or any feature thereof and where any of the conditions or specifications of the EMPr and EA have been infringed. In the instance of environmental damage, the damage is to be repaired and rehabilitated using appropriate measures, as far as possible and as directed by appropriate specialists, if required. These remedial actions are for the account of the contractor or other guilty party as identified by the Project Manager, Applicant or ECO. Where non-repairable damage is inflicted upon the environment or non-compliance with any of the EMPr / EA obligations is registered, then the Contractor may face a monetary penalty for an amount specified by the Project Manager / ECO. The Project Manager / ECO reserves the right to implement a first offence warning.

If excessive infringement with regard to any of the specifications is registered, the Applicant / Project Manager / Owner reserve the right to terminate the contractor's contract.

Table 3. Penalties Scheme – to be reviewed by ECO if required

Infringement	Description	Penalty
Hydrocarbon / fuel spill	Penalty to be issued when remediations not implemented timeously	R 5000
Disturbance beyond approved footprint	Disturbance to vegetation beyond approved areas	R 5000
Waste management	Inappropriate waste management	R 3000 dependent of extent
Not adhering to conditions of EA	Not attending to specific EA conditions	R 3000 + per condition

Environmental Control Sheets

Environmental Control Sheets should be used by the ECO on a weekly basis to monitor construction activities to ensure compliance with recommendations. The ECO should familiarise themselves with the full set of recommendations proposed by the specialists for the site and reasons for these recommendations, as well as understand the site and constraints analysis and be able to identify the constraints / No Go areas.

Table 4. Environmental Control Sheets

					RECORD OF PERFORMANCE		
TASK	**ACTION REQUIRED / MITIGATION & METHOD FOR IMPLEMENTATION**	**FREQUENCY**	**TARGET / OUTCOME**	**RESPONSIBILITY**	**COMPLETED YES/ NO**	**DATE**	**COMMENT**
PRE-CONSTRUCTION							
Procurement	→ EA and EMPr to be distributed to contractor at tender stage to include costing incurred due to compliance with EA and EMP METHOD: Distribute with tender documents	As required	Contractors are aware of requirements in terms of NEMA and can budget accordingly	Developer Project Manager			
Environmental File	→ To include EA, EMPr, site diary, public complaints section → To be updated on a regular basis → Public complaints register → Kept on site at all times METHOD: Issue all applicable documents to site manager	As required	Construction team(s) and general public can access relevant information if and when required	ECO Project Manager			
Environmental Awareness and training induction	- All contractors to attend briefing prior to commencement of site works - Register to be signed as proof of attendance METHOD: Briefing to be undertaken by project manager and / ECO	As required	Construction team(s) informed of all requirements in terms of EMPr and EA	ECO Project Manager			

Method Statements	- Contractors to submit Method Statement (MS) seven working days prior to commencement on site - MS to contain clear methods for pollution control measures during construction including hazardous waste, run off, general waste etc. METHOD: Request for Method Statements to be contained in tender documents	As required	ECO and Project Manager to be comprehensively informed of methods of construction	Contractor			
Site definition and demarcation	- Site survey and pegging - Site demarcation and fencing (mark construction areas – all other areas are No Go) - Access roads for construction vehicles to be clearly indicated, consideration to be given to turning circles - Review of specialist input to familiarise with mitigation measures - Buffer areas to be indicated and demarcated as No Go METHOD: Demarcation methods to be undertaken as outlined in EMPr, suitable to the environment and semi-permanent to last as long as possible during construction phase, to be checked on a regular basis	As required and to be repeated on a regular basis in the event that demarcations shift or disturbed by operators, weather etc.	A well demarcated site Appropriately defined No-Go areas Well defined construction zones	ECO Project Manager Contractor			
Construction traffic	- All construction vehicles carrying materials must use cover sheeting to prevent loss of loads due to wind or rain - Maximum speed to be enforced - Movement of construction vehicles must be limited to approved haul and access routes and existing tracks	Duration of Construction	A safe working environment with minimal impact on No Go areas, minimal dust impact, minimal loss of load and minimal general public impact	Project Manager Contractor			

	METHOD: To be monitored by ECO and Project Manager as well as construction team leaders						
Emergencies protocol	- Staff to be aware of actions to be taken in the event of a natural or medical emergency - Applicable Occupational Health and Safety required in terms of OH&S Act METHOD: OH&S officer to be appointed, appropriate signage to be implemented	Duration of Construction	A safe working environment with minimal incidences	Project Manager Contractor			
Fire	- Fire Management requirements to be implemented - Required firefighting equipment is available on site, and in working order - No open fires are lit on site without approval of the ECO and Site Manager METHOD: To be checked by the ECO and project manager and implemented by the contractor	Duration of Construction	A safe working environment with minimal incidences Action plan in the event of a fire	Project Manager Contractor			
Contractors camp	- Contractor's Camp is located at the most suitable site as identified by the ECO and Site Manager, preferably in areas to be developed or used (i.e. roads or house footprints) or already transformed areas - Contractor team to be briefed regarding Do's and Don'ts of camp and site in general - Suitable toilet facilities are provided for all staff (1 toilet /10 staff member) - Ablutions are to be restricted to the facilities provided - Toilets are to be kept in a hygienic condition and emptied regularly	Duration of Construction	A well placed and functional contractors camp to minimise impacts on other areas on site	Project Manager Contractor			

	- Recommendations by Freshwater specialist will be implemented METHOD: Site to be determined in conjunction with project manager and ECO, to be well demarcated with appropriate signage, serviced and cleaned on a regular basis, checked by ECO.						

CONSTRUCTION							
TASK	**ACTION REQUIRED / MITIGATION & METHOD FOR IMPLEMENTATION**	**FREQUENCY**	**TARGET / OUTCOME**	**RESPONSIBILITY**	**COMPLETED YES/ NO**	**DATE**	**COMMENT**
Topsoil removal and stockpiling	- Replace topsoil immediately after works where required - Topsoil which is required to be removed from direct work areas, should be stockpiled separately from subsoil and reused as far as possible - Stockpiles should be suitably shaped to prevent leaching of nutrients, and stabilized, or dispersal by wind or rain - Stockpiles to be monitored for dispersal by rain and wind METHOD: Implement conditions outlined in EMPr for stockpiling and topsoil removal	Duration of Construction	Reusable sand and soil stockpiles to facilitate rehabilitation of the site	Project Manager Contractor			
Earthworks	- Works to be restricted construction area only - Bulldozer/ heavy machinery operators to be under constant supervision particularly at onset of works - Use and excessive movement of heavy machinery to be avoided in areas of environmental sensitivity or high erosion potential - Trenching to be undertaken in a phased manner - Fill material to be replaced in same work area from which it originated - Fill material to be compacted to its approximate original density	Duration of Construction	Minimal disturbance to sensitive zones, minimal disturbance to vegetation	Project manager Contractor ECO			

	METHOD: Construction zone to be clearly demarcated, instruction for stockpiling to be implemented, operators to be briefed prior to works						
Material handling, dispatching and storage	- Fuels and hazardous materials to be stored in suitably equipped storage areas in the Contractor's camp and approved by the ECO - Strict measures to be put in place for the use and storage of hazardous materials on site - Disposal to licenced facility only - These areas shall comply with fire safety requirements - Impervious materials are to be used to prevent contamination of the ground in the event of spillages or leaks - Construction materials spilled on public or private roads to be immediately cleaned - No storage other than contractor camp METHODS: Undertake regular inspections of areas and procedures	Duration of Construction	Minimal disturbance to sensitive zones including non-perennial drainage line Minimal incidences	Project Manager Contractor			
Stockpiles	- Sites for stockpiling as identified by the Contractor are to be marked on a plan, and approved by the ECO and Site Manager - Stockpiles must be suitably stabilized where necessary METHODS: Undertake regular checks of stockpiles to ensure methods outlined in the EMP and Dune EMP are implemented	Duration of Construction	Reusable sand and soil stockpiles to facilitate rehabilitation of the site	Project Manager Contractor ECO			

Waste management	- All waste to be stored in an appropriate contained area on site, and protected against wind, rain and animal dispersal - Waste to be removed on a weekly basis for disposal at a permitted disposal site - No burning or burying of refuse on site is allowed - Eating areas must be demarcated and provided with suitable refuse collection areas METHOD: Waste areas to be designed correctly and be wind and weatherproof and emptied on a regular basis	Duration of Construction	A clean waste collection point which is serviced on a regular basis	Project Manager Contractor ECO			
Construction wastewater	- Careful runoff management will be required particularly during construction. No contaminated water should be allowed to seep into the ground or runoff the construction site - All runoff from batching plants, work areas and mixer washings (washout) to be contained in sedimentation ponds, which are suitably lined - Ponds must be allowed to dry out regularly, and solid waste removed and disposed of at a site approved by the local authority. METHOD: Wastewater areas to be suitably designed and inspected on a regular basis.	Duration of Construction	A clean site post construction	Project Manager Contractor ECO			
Maintenance of equipment	- All mechanical equipment and work vehicles to be stored, serviced and refuelled at designated areas in the contractor's camp - Major services to take place off site	Duration of Construction	A clean site post construction	Project Manager Contractor ECO			

	- Drip trays or impervious materials to be used to prevent contamination of ground METHOD: Regular inspections undertaken						
Stormwater	- Suitable measures must be in place to prevent erosion resulting from diversion, restriction or increase in stormwater runoff - Measures must be taken to prevent stormwater from flowing from excavated areas or stockpiles - Stormwater containing harmful substances to be contained, and removed from site METHOD: Regular inspections undertaken	Duration of Construction	A clean site post construction, avoiding additional impact on surrounds	Project Manager Contractor ECO			
Erosion	- Specialist advice to be sort where required - Stormwater channels are to be kept clear from soil and debris - Erosion or stormwater damage resulting from Contractor's operations to be appropriately repaired - Suitable stabilization measures are to be implemented wherever works are taking place as outlined in this document - Where erosion is detected, suitable mitigation methods are to be employed as soon as possible METHOD: Regular visual inspections undertaken	Duration of Construction	A clean site post construction, avoiding additional impact on surrounds	Project Manager Contractor ECO			
Dust	- Sand stockpiles are to be covered with Hessian, shade cloth or DPC plastic. - Stockpiles are to be located in sheltered areas and the useable face to	Duration of Construction	A clean site post construction, avoiding additional impact on surrounds, avoidance of impacts on general public	Project Manager Contractor ECO			

	be orientated away from the prevailing wind. - Excavation and transporting erodible material during high wind conditions - water dampening measures or cessation of activities should be required - If necessary, certain components of the work should be stopped until conditions are more favourable - Vehicles must not exceed 40 km/h along gravel roads - If roads generate unacceptable levels of dust, suppression measures should be introduced - If water is used only the critical areas should be watered by cart or hand to avoid unnecessary run-off, erosion or misuse METHOD: Areas and activities of possible dust generation to be inspected on a regular basis, as well as strategies to address dust						
Site clean-up and rehabilitation	- All structures, equipment materials and facilities are to be removed from site on completion of the project - Construction site shall be cleared and cleaned to the ECO's satisfaction - Site / Area Rehabilitation to be conducted in line with recommendations herein - Specialist advice to be sort where required - No waste or remaining materials to be buried on site	Duration of Construction	A functional ecosystem post construction, suitably rehabilitated as required	Project Manager Contractor Applicant ECO			

	METHOD: Inspected upon site closure / suspension of works, rehabilitation methods contained in EMP and Dune EMPr to be implemented						
Alien Clearing	- An AIPS control plan must be compiled which includes measures to control and prevent the proliferation of AIPS during the operational phase. - The plants should be removed by digging out all rhizomes / stolons. - Care should be taken to remove all rhizomes / stolons to prevent the kikuyu from re-sprouting. - Do not apply herbicide while it is raining and take care to prevent it from spilling, spraying, or spreading onto the ground or onto non-target species. - Rain may wash herbicide into watercourses and spread it downstream, or across banks that need to be revegetated. - Never wash herbicide equipment or dispose of waste spray mixture in or near watercourses where contamination can occur. - In line with the NEMBA, all AIPS listed under the amended AIPS Lists (DEFF: GN1003, 2020) must either be removed or controlled on land under the management of the proponent. An AIPS control plan must therefore be compiled which includes measures to control and prevent the proliferation of AIPS during the construction phase.	Construction and Post-construction phase	Long term ecological integrity and restoration of vegetation onsite.	Project Manager Applicant Contractor ECO			

	METHOD: Regular monitoring of rehabilitation progress, alien plant regrowth, and any faunal presence should be conducted during and after the construction phase. Adaptive management practices should be applied to address emerging issues and ensure that the long-term ecological integrity of the site is maintained.						
Freshwater Specialist	- The extent of works within the UVBW should be limited as far as possible (both in terms of extent and duration and should be within the road reserve area). - Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable). - Locate site camps, laydown areas, stockpile areas, construction material, equipment storage areas, vehicle parking areas, bunded vehicle servicing areas and re-fuelling areas in	Construction and Post-construction phase	Long term ecological integrity and rehabilitation of the site.	Project Manager Applicant Contractor ECO			

	designated areas of already hardened surface or disturbed areas located outside of the No Go area. These areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO). Cut and fill must be avoided where possible during the set-up of the construction site camp. - Demarcation of the construction footprint/working servitude must be signed off by an ECO (or similar). Demarcation should not be removed until construction is complete, and rehabilitation (if applicable) has taken place. - Prohibit the dumping of excavated material, building materials or removed vegetation within the No Go area. Building material must be stored at the designated storage area located outside of the no-go area. Spoil material must be appropriately disposed of at a registered waste disposal facility. - Undisturbed topsoil and subsoils removed from the construction footprint must be stored separately at the designated stockpile area for future rehabilitation. - Vegetation clearance should be restricted to the relevant development components and indigenous						

	vegetation cover should be maintained as far as practically possible. - Vegetation which is considered suitable for rehabilitation activities after construction (such as indigenous grasses and other herbaceous species) should be carefully removed from the construction footprint and stored at an appropriate facility for use in later rehabilitation activities (as applicable). - Clear and remove any rubble or litter that may have been accidentally deposited into the no-go area because of construction activities and dispose of at an appropriate registered facility. - An ECO must inspect the construction footprint of the road upgrade on a weekly basis and must take immediate measures to address unforeseen disturbances to the wetland. Any disturbed / compacted areas falling outside of the demarcated construction footprint must be immediately rehabilitated. Depending on the extent of damage the method of rehabilitation may require input from an aquatic specialist / suitably qualified contractor. - Once construction has been completed, orange hazard fences as well as all construction waste, rubble, and equipment must be removed from the construction footprint. - In line with the NEMBA, all AIPS listed under the amended AIPS Lists (DEFF:						

	GN1003, 2020) must either be removed or controlled on land under the management of the proponent. - Vegetation which needs to be re-planted (if applicable) should be planted with indigenous vegetation. - A Rehabilitation, Maintenance and Management Plan must be drafted by a suitably qualified specialist. - Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel outside of the demarcated areas (as applicable). - Should flow need to be impeded or diverted temporarily within the watercourse while works are being undertaken, it is recommended that the diversion be undertaken during the dry season and that the flow be piped past the works and discharged into the watercourse immediately downstream of the works. The diversion should be kept to a minimum period and should						

	be mitigated to ensure that no sedimentation or erosion is resulting downstream. - Natural water flow within the UVBW must be maintained. Multiple culverts or open-bottom structures to maintain sheet flow is recommended as well as permeable shoulders or subgrades to allow natural infiltration of water into wetland soils where and as applicable. - The works within the UVBW should (where possible) take place during the drier months of the year (October to May) when there would be minimised impact in terms of flow and water quality. Where construction during the wet period cannot be avoided, it is recommended that the proposed method statement be compiled for undertaking the works during higher flows that specifically address limiting contamination and sediment at the site from impacting downstream aquatic habitat. - Ensure that effective stormwater management measures are implemented during construction, particularly associated with runoff from the road. Stormwater management must ensure that no runoff, which will impair the water quality and lead to increased sedimentation, may enter the downstream wetland area. Additionally, clean SW which does						

	enter the downstream wetland system should do so in a manner that ensures no erosion occurs specifically during storm events, such as through vegetated swales. - Stormwater systems will require ongoing maintenance. Any build-up of silt or debris within stormwater drains or swales will need to be cleared to ensure the continued functioning of the systems. - Any damage to stormwater infrastructure, and any flaws identified in the functionality of stormwater infrastructure, must be rectified immediately. - Silt fencing and/or sediment basins should be installed prior to construction activities, in areas prone to sedimentation/erosion, to trap sediments and prevent runoff into wetlands. - Implement erosion control measures where required. Examples of erosion control measures include: - Covering steep/unstable/erosion prone areas with geotextiles. - Covering areas prone to erosion with brush packing, straw bales, mulch. - Stabilizing cleared/disturbed areas susceptible to erosion with sandbags. - Constructing silt fences / traps in areas prone to erosion, to retain sediment-laden runoff. Silt fences must be adequately maintained. Furthermore,						

	the ECO / site manager must monitor sediment fences / traps after every heavy rainfall event and any sediment that has accumulated must be removed by hand. - Rainwater harvesting schemes (for the residential development) may reduce runoff intensity and thereby mitigate the impact of catchment hardening. - The alien invasive vegetation present within the wetland area must be removed and replanted with indigenous wetland vegetation. - A Rehabilitation, Maintenance and Management Plan must be drafted by a suitably qualified specialist. - The extent of works within the UVBW should be limited as far as possible (both in terms of extent and duration and should be within the road reserve area). - Designate the high sensitivity / functional UVB wetland area as a No Go for construction activities (for both the residential development and the replacement / upgrade of the sewer pipeline) as far as possible. Clearly demarcate the construction footprint (including construction camp, access roads, stockpile areas and working servitudes) with orange hazard tape, fencing or similar prior to the commencement of any activity, and strictly prohibit the movement of construction vehicles and personnel						

	outside of the demarcated areas (as applicable). - The works within the UVBW should (where possible) take place during the drier months of the year (October to May) when there would be minimised impact in terms of flow and water quality. Where construction during the wet period cannot be avoided, it is recommended that the proposed method statement be compiled for undertaking the works during higher flows that specifically address limiting contamination and sediment at the site from impacting downstream aquatic habitat. - Ensure that effective stormwater management measures are implemented during construction, particularly associated with runoff from the road. Stormwater management must ensure that no runoff, which will impair the water quality and lead to increased sedimentation, may enter the downstream wetland area. Additionally, clean SW which does enter the downstream wetland system should do so in a manner that ensures no erosion occurs specifically during storm events, such as through vegetated swales. - Silt fencing and/or sediment basins should be installed prior to construction activities, in areas prone						

	to sedimentation/erosion, to trap sediments and prevent runoff into wetlands. - The site manager / ECO must check the No Go area for pollution/spills, erosion damage and sedimentation weekly and after every heavy rainfall event. Should pollution, erosion or sedimentation be noted, immediate corrective measures must be undertaken. - Fuel, chemicals, and other hazardous substances should preferably be stored offsite, or as far away as possible from the no-go area. These substances must be stored in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding, or storm damage. - Inspect all storage facilities, vehicles, and machinery daily for the early detection of deterioration or leaks and strictly prohibit the use of any vehicles or machinery from which leakage has been detected. - Mixing and transferring of chemicals or hazardous substances must take place outside of the No Go area, and must take place on drip trays, shutter boards or other impermeable surfaces. - Drip trays must be utilised at all fuel dispensing areas; and during the maintenance of existing sewer flow as possible.						

	- Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site it must only take place within designated areas outside of the No Go area and should only occur on bunded areas with a water/oil/grease separator. - Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site. - Avoid the use of infill material or construction material with pollution / leaching potential. Where possible, in situ earthen materials must be used during construction to reduce the risk of leachate from imported materials contaminating the wetland area. - Concrete should preferably be imported as "ready-mix" concrete from a local supplier. Should onsite concrete mixing be required it must not be done on exposed soils. Concrete must be mixed on an impermeable surface in an area of low environmental sensitivity identified by the ECO outside of the no-go area. Surplus or waste concrete must be sent back to the supplier who will dispose of it. - Construct temporary bunds around areas where cement is to be cast in situ. - Dispose of concrete and cement-related mortars in an environmental sensitive manner (can be toxic to						

	aquatic life). Disposal of any of these waste materials into the No Go area is strictly prohibited. - Washout must not be discharged into the no-go area. A washout area should be designated, and washout water should be treated on-site. - Clean up any spillages immediately with the use of a chemical spill kit and dispose of contaminated material at an appropriately registered facility. - Provide portable toilets where work is being undertaken (1 toilet per 10 workers). These toilets must be located within an area designated by the ECO outside of the no-go area and should preferably be located on level ground. Portable toilets must be regularly serviced and maintained. - Provide an adequate number of bins on site and encourage construction personnel to dispose of their waste responsibly. - Waste generated by construction personnel must be removed from the site and disposed of at a registered waste disposal facility on a weekly basis. - Design a SWMP which will allow for the infiltration and treatment of stormwater. All stormwaters must receive basic filtering and treatment prior to its release. - Incorporate measures into the stormwater design to trap solid waste,						

	debris and sediment carried by stormwater. Measures may include the use of curb inlet drain grates and debris baskets/bags. - Stormwater generated from areas with a higher risk of contamination such as parking areas and roads (as applicable) must receive basic filtering and treatment prior to its release into surrounding areas. - Stormwater systems must be monitored and maintained into perpetuity and collections of debris and solid waste removed from grates and baskets. - Operational phase mitigation implemented during the design/construction phase: - Construct sewage pipelines in accordance with the relevant SANS / SABS specifications. - Design the pipelines to accommodate the operating and surge pressures. - Provide surge protection e.g. air valves. - Allow for scour valves along pipelines to ensure sewage pipelines can be emptied in a controlled manner if required. - Allow for surcharge containment and emergency storage of 2 hours of peak flow at manholes located within areas upslope of the wetland. Containment/emergency storage may include a concrete box or earthen bund surrounding the manholes. The backup						

	storage capacity of manholes may also be improved by raising the manholes by one meter. - The sewage system must be monitored and maintained into perpetuity. The developer must confirm who will be responsible for this monitoring and maintenance as well as their roles. - These measures should be addressed, implemented and monitored in terms of the Environmental Management Plan for the construction phase.						

10 DECOMMISSIONING PHASE

Not Applicable to this development.

11 ENVIRONMENTAL AUDITS

The purpose of auditing is to determine and monitor compliance with the EMPr and EA and measure its effectiveness in mitigating environmental impacts. In terms of Regulation 34 of the NEMA EIA Regulations, 2014, the holder of the EA must conduct environmental audits in order to determine compliance with the conditions of the EA and EMP. Environmental Audit Reports should be submitted to the Competent Authority or as stipulated in the EA. The audit reports should be prepared by an independent person. The audit report should also provide recommendations regarding the need to amend the EMP.

The objective of the environmental audit report is to:

- → Report on the level of compliance with the conditions of the EA and the EMPr
- → Report on the extent to which the avoidance, management and mitigation measures outlined in the EMPr, achieve the objectives and outcomes of the EMPr
- → Identify and assess any new impacts and risks as a result of the activity
- → Evaluate the effectiveness of the EMPr
- → Identify shortcomings in the EMPr
- → Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr.

An environmental audit report should contain the following:

- → Details and expertise of the independent person who prepared the environmental audit report
- → A declaration that the auditor is independent
- → An indication of the scope of, and the purpose for which, the environmental audit report was prepared
- → A description of the methodology adopted in preparing the environmental audit report
- → An indication of the ability of the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity as well as to ensure compliance with the provisions of environmental authorisation and EMPr.
- → A description of any assumptions made, and any uncertainties or gaps in knowledge
- → A description of any consultation process that was undertaken during the course of carrying out the environmental audit report if required
- → A summary and copies of any comments that were received during any consultation process
- → Any other information requested by the competent authority.

12 CONCLUSION

This EMPr has been developed as part of the Basic Assessment process to ensure that mitigation and management measures are enforced during the construction phase of the development, and that the conditions of the EA are upheld. The EMPr should guide all phases of the project to minimize possible negative impacts and assign responsibility for environmental controls. The EMPr provides a tool to recognise the needs of the environment and is intended to be utilised in conjunction with the Environmental Authorisation.

13 DECLARATION OF CONTRACTOR'S ACCEPTANCE

I, _____ (name), representing

_____ (company name), have read and understood the above Environmental Management Plan and hereby acknowledge its contents and requirements as a framework for my company's environmental performance during the applicable development.

Signed: _____ Date: _____