

Draft Environmental Management Programme: Proposed Hlomendlini Sports Field in Mandeni

Report Prepared for

Mandeni Local Municipality



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Report Prepared by



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Mandeni Local Municipality

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Mandeni Local Municipality (Mandeni Municipality). The opinions in this Report are provided in response to a specific request from Mandeni Municipality to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AMAFA	Amafa aKwaZulu-Natali
CBA	Critical Biodiversity Area
CLO	Community Liaison Officer
DWS	Department of Water and Sanitation
ECA	Environmental Compliance Auditor
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Officer
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
PM	Project Manager
SHE	Safety, Health and Environment
SHEM	Safety, Health and Environmental Manager
SRK	SRK Consulting South Africa (Pty) Ltd.

**NOTE: FOR EASE OF REFERENCE AMENDMENTS TO THE EMPr
CIRCULATED WITH THE DRAFT BA REPORT ARE IN BLUE TEXT,
UNDERLINED AND ITALICISED**

1 Introduction and Scope of Report

The Mandeni Local Municipality (Mandeni Municipality) owns a site of approximately 3.4 hectares in extent situated in a residential area south-west of Padianager and Tugela in Mandeni, KwaZulu Natal. The site is currently utilised as an informal sports field for the community of Hlomendlini. The Mandeni Municipality is proposing to formalize the Hlomendlini Sports field. This Environmental Management Programme (EMPr) forms part of the submission of the Basic Assessment Report and is structured in compliance with Appendix 4 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014 (as amended).

This EMPr includes the following:

- Background to the proposed development.
- Assumptions and uncertainties.
- General objectives and purpose of the EMPr.
- Legal requirements.
- Roles and responsibilities.
- Mitigation and management measures relating to impacts identified with associated timeframes and responsibilities for implementation and monitoring.

1.1 Project Description

The proposed development will include construction of the following infrastructure (refer to Appendix A for the layout plan):

- A soccer field.
- Open stands.
- Ablutions and changerooms.
- Conservancy tank with a 110mm diameter sewer line from the ablution facilities to the conservancy tank.
- Water line linking into an existing water meter located offsite.
- A combi court.
- The entire site will be enclosed with a clear view/beta fence with one pedestrian gate and associated guard house, and one service gate entrance / exit.

The NEMA 2014 EIA Regulations provide three Listing Notices that detail activities that trigger the need to obtain an Environmental Authorisation (EA). Listing Notices 1 and 3 require a Basic Assessment processes to be undertaken as part of the EA application process and Listing Notice 2 requires a Scoping and EIA process. The listed activities triggered by the proposed development are detailed in Table 1-1.

Table 1-1: EIA Regulations, 2014 listed activities triggered by the proposed development

No.	Activity description	Applicability to proposed project
NEMA EIA Listing Notice 1 (GN 327) – BA process required		
<u>12</u>	<u>The development of ii) infrastructure or structures with a physical footprint of 100m² or more; where such development occurs a) within a watercourse.</u>	<u>The proposed sports field and a section of the fenceline will be constructed within the valley head seep wetland. An area of 0.089ha (890 m²) of wetland will be lost.</u>

No.	Activity description	Applicability to proposed project
19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.	<u>The proposed development will include the infilling of approximately 1 085 m³ of the wetland. A total of approximately 1 745 m³ of wetland and the associated 30m buffer will be infilled.</u>
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— i) the undertaking of a linear activity; or ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This listed activity is applicable as the site comprises of mostly grassland (KwaZulu-Natal Coastal Belt Thornveld) <u>and approximately 1.6ha of indigenous vegetation will be cleared.</u>

1.2 Aspects and Impacts

The aspects identified as a result of the listed activities, and the associated potential impacts assessed in the Basic Assessment Report (refer to Section 13 of the BAR) are detailed in Table 1-2.

Table 1-2: Summary of aspects and associated potential impacts

Aspect	Listed Activity	Potential Impacts
Construction Phase		
1) <u>Site preparation prior to construction activities:</u> a) <u>Movement of construction equipment within channelled valley-bottom (CVB) and valley head seep wetlands.</u>	<u>Activity 12 and Activity 19 of LN1</u>	<ul style="list-style-type: none"> i. <u>Loss of wetland vegetation and associated habitat and ecosystem services associated with the proposed water pipelines.</u> ii. <u>Indiscriminate movement of construction equipment through the wetlands.</u> iii. <u>Transportation of construction materials can result in disturbances to soil and increased risk of sedimentation and/or erosion.</u> iv. <u>Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles.</u>
b) <u>Removal of vegetation and associated disturbances to the soil, especially the potential clearance of vegetation within the wetland habitat of the valley head seep wetland for the construction of the proposed main soccer field.</u>	<u>Activity 27 of LN1</u>	<ul style="list-style-type: none"> v. <u>Loss of freshwater habitat and ecological structure, particularly along the western portion of the valley head seep wetland associated with the proposed main soccer field.</u> vi. <u>Exposure of soil, leading to increased runoff and erosion, and thus increased sedimentation of the wetlands.</u> vii. <u>Increased sedimentation of the wetlands, leading to smothering of vegetation in the downstream reaches.</u> viii. <u>Proliferation of alien and/or invasive vegetation as a result of disturbances.</u>
2) <u>Ground-breaking and earthworks:</u> <u>Movement of construction machinery/ vehicles within the valley head seep wetland and within the vicinity of the CVB wetland, potential spills and/or leaks from construction vehicles and earthworks (including excavation, infilling and levelling of soil to create a levelled platform, compaction</u>	<u>Activity 12 and Activity 19 of LN1</u>	<ul style="list-style-type: none"> i. <u>Total loss of 0.089 ha of valley head seep wetland habitat as a result of the proposed main soccer field and terrace within the wetland.</u> ii. <u>Disturbances of soil leading to ponding of water as a result of over compaction of soil in some areas, increased alien vegetation proliferation, and in turn altered wetland habitat and runoff patterns.</u> iii. <u>Altered runoff patterns, leading to increased erosion and sedimentation of the receiving wetlands.</u>

<u>Aspect</u>	<u>Listed Activity</u>	<u>Potential Impacts</u>
<u>of soil and stockpiling of excess soil).</u>		<ul style="list-style-type: none"> iv. <u>Potential erosion and formation of preferential flow paths as a result of disturbed soil and inappropriate slopes resulting in sedimentation of the wetlands.</u> v. <u>Disruption to the embankment, potentially causing sedimentation.</u> vi. <u>Ground disturbances and dust pollution during construction which may impact water quality.</u>
3) <u>Installation of water pipeline, irrigation line and sewer line:</u> <u>Excavation and trenching leading to stockpiling of soil and movement of construction equipment and personnel within the wetlands during the installation of the proposed water pipeline within the 32m of the CVB; the proposed irrigation line within the 32 m of the valley head seep wetland; and the proposed sewer line within 40 m of the valley head seep wetland.</u>	<u>Activity 12 and Activity 19 of LN1</u>	<ul style="list-style-type: none"> i. <u>Disturbances of soil leading to disturbance to the wetland vegetation and resulting in increased sediment loads in the downgradient areas</u> ii. <u>Increased alien vegetation proliferation in the footprint areas, and in turn to altered wetland habitat.</u> iii. <u>Altered runoff patterns, leading to increased erosion and sedimentation of the wetlands during rainfall events</u>
4) <u>Stormwater Management:</u> <u>The establishment of stormwater channels and outlet structures</u>	<u>Activity 12 and Activity 19 of LN1</u>	<ul style="list-style-type: none"> i. <u>Alterations to the sediment loads within the wetlands.</u> ii. <u>Potential deposition of waste material into the wetlands.</u> iii. <u>Potential changes to the water retention pattern of the wetlands</u>
5) <u>Socio-economic (Duty of Care):</u> <u>Construction activities</u>		<ul style="list-style-type: none"> i. <u>Improved quality of life through temporary employment opportunities.</u> ii. <u>Noise pollution from construction activities.</u> iii. <u>Deterioration in air quality from dust that may be created through the construction process and fires on-site.</u> iv. <u>Heritage resource disturbance during earth moving activities.</u>
<u>Operational Phase</u>		
1) <u>Small-scale rehabilitation of the area:</u> <u>Small-scale rehabilitation of the valley head seep wetland activities, including the re-vegetation of surrounding wetland areas, removal of alien and invasive plants and any obstructions to flow; proactive monitoring to identify early signs of alien vegetation encroachment</u>	<u>Activity 19 of LN1</u>	<ul style="list-style-type: none"> i. <u>Soil compaction within the wetlands.</u> ii. <u>Potential sedimentation of the valley head seep wetland due to activities within the wetland.</u> iii. <u>Impacts to water quality of the wetlands as a result of the application of herbicides.</u>
2) <u>Operation of the Sports Facility:</u> <u>Increased impermeable surfaces due to the presence of roofs, parking areas, access roads, etc. and potential indiscriminate movement of</u>	<u>Activity 27 of LN1</u>	<ul style="list-style-type: none"> i. <u>Altered runoff patterns and increased water inputs to the receiving wetlands, resulting in altered flow regime.</u> ii. <u>Altered flow regime may lead to changes to and impacts on vegetation as a result.</u> iii. <u>Proliferation of alien and invasive plant species within the wetlands.</u>

<u>Aspect</u>	<u>Listed Activity</u>	<u>Potential Impacts</u>
<u>vehicles within the freshwater ecosystems for perimeter inspections/ maintenance</u>		
3) <u>Operation of the proposed water pipeline:</u> <u>Potential leakage of water from the pipelines</u>	<u>Activity 19 of LN1</u>	i. <u>Possible incision and alteration of the hydroperiod of the downgradient wetlands.</u> ii. <u>Potential impacts to the water quality of the wetland.</u>
4) <u>Operation and maintenance of conservancy tanks and associated infrastructure:</u> <u>Possible indiscriminate movement of waste removal vehicles leading to damage to the conservancy tanks</u>	<u>Activity 27 of LN1</u>	i. <u>Potential failure of infrastructure resulting in anaerobic conditions within the conservancy tanks and possible spillage and runoff of sewage from the conservancy tanks into the wetlands decreasing the quality of surface water.</u> ii. <u>The anaerobic conditions in the conservancy tank system could lead to a decrease in effluent quality which may enter the wetlands.</u>
5) <u>Monitoring of the sewer and water pipelines, and operation of the stormwater management system:</u> <u>Proactive monitoring of the sewer and water pipelines, and operation of the stormwater management system to ensure structural integrity is maintained</u>	<u>Activity 27 of LN1</u>	i. <u>Compaction of soil and loss of habitat as a result of ongoing disturbance from vehicles and equipment.</u> ii. <u>Disturbance of soil which could lead to erosion.</u>

1.3 Description of the site

The site is zoned Active Open Space, covers an area of approximately 3.4 ha and a portion of the site is currently used as a soccer field by the local community. There is a partially constructed building towards the southern boundary of the site. The site lies approximately 125m from a Critical Biodiversity Area (CBA).

Moderate topographic variations occur from the south to the north of the site (194 metres above mean sea level (mamsl) to 179 mamsl). Gentle topographic variations occur from the east to the west of the site (182 mamsl to 187 mamsl).

Hlomendlini can be described as an impoverished rural area where unemployment is high. Infrastructure in the area, such as roads are lacking maintenance and require urgent repairs. Access to the area is via a single lane bridge from the P415.

The site falls within the KwaZulu-Natal Coastal Belt Thornveld vegetation type within the Indian Ocean Coastal Belt biome.

Refer to Appendix A for the project locality and Appendix

1.4 Drafters of the EMPr

Table 1-3 provides information on the compilers of this document and their related experience.

Table 1-3: Drafters of the EMPr

Name	Qualifications	Years of experience
Wouter Jordaan Pr.Sci.Nat.	B.Sc. (Hons) Geography and Environmental management	16 Years

Name	Qualifications	Years of experience
Tamaryn Hale Pr.Sci.Nat. Reg. EAP (EAPASA)	B.Sc. (Hons) Environmental Science	13 Years

1.5 Assumptions and uncertainties

While due process has been followed in the compilation of this EMPr it is the view of the Environmental Assessment Practitioner (EAP), that there are inherent uncertainties in any such process. The assumptions for the purpose of the EMPr are as follows:

- All the technical data and information provided by Mandeni Municipality to SRK Consulting are accurate and up-to-date.
- Mandeni Municipality and its contractors will implement the measures contained in this EMPr.
- A monitoring and evaluation system, including auditing, will be established to track the implementation of this EMPr to ensure that management measures are effective to avoid, minimize and mitigate impacts; and corrective action is undertaken to address shortcomings and/or non-conformances.
- Mandeni Municipality and its consultants will adopt a process of continual improvement when managing and/or mitigating negative environmental impacts arising from the project. This EMPr will be used as the basis of environmental management and will be improved and refined regularly.

2 General Objectives and Purpose of the EMPr

The key objectives of this EMPr are to document appropriate actions and to assign responsibilities for those actions, and to ensure that any impacts resulting from the construction phase of the proposed sports field are minimised and mitigated. This ensures that the basis on which any decision is taken includes environmental considerations and that the impacts on the surrounding environment are minimised.

This EMPr serves as a stand-alone document to be disseminated to and used by the contractor/s during the construction phases. By its very nature, the EMPr is a dynamic document and updating should occur as and when required.

The purpose of this EMPr is to:

- Outline Mandeni Municipality's environmental management commitments for the site during construction.
- Ensure adherence to all relevant environmental, health and safety legislation.
- Act as a performance standard that activities can be audited against.
- Ensure that appropriate monitoring is undertaken.

Mandeni Municipality is responsible for ensuring adherence to the conditions detailed in the EMPr and the EA (Appendix C). The project manager, contractor(s) *etc.*, are all bound by the EMPr and must use this document as a guide to avoid, minimise and manage environmental impacts.

3 Legal Requirements

3.1 Legal requirements for EMPr

Appendix 4 of the NEMA EIA Regulations sets out the minimum requirements for the development of an EMPr. This EMPr has been developed in fulfilment of these requirements for the construction phase of the proposed project.

The implementation of an EMPr for the proposed activity is a requirement of the EA and the provisions for Duty of Care and remediation of environmental damage contained in Section 28 of the NEMA. As

such, failure to comply with this EMPr will constitute an offence and Mandeni Municipality and/or their Contractor may be liable for penalties and/or legal action. Therefore, it is important for all the responsible parties to understand their duties and undertake them with duty and care.

This EMPr, which should form an integral part of the contract documents, informs and guides the Contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation. Further, the EMPr is enforceable through additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

It is expected that the Contractor is conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

All prospective contractors must sign the declaration of acceptance of the EMPr, included at the end of this document, upon receipt.

3.2 Other Applicable Environmental Legislation

The following is a list of all additional legislation, policies and/or guidelines of relevant spheres of government that may be applicable to this application:

- National Environment Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA).
- National Ambient Air Quality Standards in Terms of Section 9(1)(a) and (b) of the NEM: AQA.
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM: PA).
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA).
- National Forests Act, 1998 (Act No. 84 of 1998).
- National Heritage Resources Act, 1999 (Act No. 25 of 1999).
- KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008).
- Health Act, 1977 (Act No. 63 of 1977).
- Housing Act, 1997 (Act No. 107 of 1997).
- Occupational Health & Safety Act, 1993 (Act No. 85 of 1993).
- Mandeni Municipality by-laws.
- Municipal Structures Act, 1998 (Act No. 117 of 1998).
- Municipal Systems Act, 2000 (Act No. 32 of 2000).

4 Roles and Responsibilities

The successful implementation of this EMPr requires co-operation between Mandeni Municipality, the appointed contractors and the appointed Environmental Control Officer (ECO)¹.

No contractors had been formally appointed for the project at the time of the compilation of this Draft EMPr. However, general roles and responsibilities have been outlined in Table 4-1 and the project team will be required to comply with the conditions defined herein.

In terms of employment of labour, contractors will be expected to maximise the employment of individuals with the required skills residing in the adjacent residential areas. Mandeni Municipality will make use of local construction companies as far as possible. Contractors outside of the area will only be used to provide skills not readily available in the area

¹ The ECO is an independent person appointed by Mandeni Municipality for the duration of the construction phase.

Table 4-1: Roles and Responsibilities

Responsible Agent	Role / Responsibility
Mandeni Municipality - Engineer's Representative / Project Manager (PM)	<ul style="list-style-type: none"> • Ensure compliance with the contract and legislative environmental requirements. Including the issuing of contract notices for non-compliance with this EMPr. • Maintain overall responsibility for ensuring that the functions defined in the EMPr are carried out effectively. • Ensure that a copy of the EMPr, and all agreed Method Statements and a layout plan are available on-site. • Ensure that all environmental protection procedures defined in this EMPr are being adhered to. • Appoint appropriately qualified contractors to co-ordinate, supervise and expedite different tasks. • Appoint an independent ECO to monitor implementation of the EMPr, during construction. • Ensure all staff, Sub-contractors, suppliers, etc. are familiar with and understand the EMPr (including revisions), and all agreed Method Statements. • Liaise with Department of Economic Development, Tourism and Environmental Affairs (EDTEA) and Interested and Affected Parties (I&APs), if required. • Maintain overall responsibility and accountability for the site during the construction phase.
Contractor – still to be appointed	<ul style="list-style-type: none"> • Ensure all personnel are fully aware of all environmental issues relating to construction activities being undertaken on site and the related precautions that need to be taken. • Ensure all mitigation measures outlined in this EMPr are properly and competently directed, guided and executed during construction. • Ensure adherence to environmental laws and standards relevant to the construction of the project. • Ensure that the construction complies with this EMPr. • Ensure that any incidents, including spills are reported to the Mandeni Municipality and ECO immediately. • Ensure waste is managed during construction in terms of this EMPr.
Environmental Control Officer (ECO) – still to be appointed	<ul style="list-style-type: none"> • Conduct a site visit prior to the start of construction to record the environmental baseline and the condition of the area prior to the start of construction. • Conduct environmental induction of all contractors prior to commencement of construction work and site establishment. • Assist in discussions relating to location of the construction camps and facilitate the necessary approvals in this regard. • Provide advice and information to all contractors and material suppliers on site with regard to (but not limited to): <ul style="list-style-type: none"> a) Waste disposal (rubble & other construction & spoil materials) b) Location of materials and site camps c) Storage of fuel and chemicals d) Clearing of any natural areas for whatever purpose e) Material supply & the source of materials – especially sand f) Wetland areas and other environmental sensitive areas within the project • Undertake regular site visits (or as per the requirements of the EDTEA in the EA), and record key findings. This includes monitoring of the construction site and an evaluation of the implementation, effectiveness and level of compliance of on-site construction activities with this EMPr, the EA and associated plans and procedures. • Conduct inspections of waste management activities (observation of any illegal dumping), permits, authorisations & other documentation such as landfill waybill receipts to verify compliance of contractors and material suppliers. • Monitor environmental compliance of all contractors within the project area with the provisions of – and in accordance with – the EMPr, the EA, conditions of the Water Use Authorisation issued by the Department of Water and Sanitation (DWS), as well as Section 28 of the National Environmental Management Act. This includes, but is not limited to: <ul style="list-style-type: none"> a) Ensuring that the contractor(s) suitably and visibly demarcate environmentally sensitive areas including the wetland/watercourse areas and associated buffers. b) Monitoring of wetland areas to confirm no unauthorised activity and storage of equipment, machinery and chemicals takes place therein.

Responsible Agent	Role / Responsibility
	<p>c) Monitoring compliance with the approved development layout plan as authorised by the EA.</p> <ul style="list-style-type: none"> • Immediately report any serious environmental non-compliance to the Project Manager and the relevant authority and give instruction to the contractor and/or engineer to cease activity, avoid/ minimize damage, or rehabilitate environmental damage. • Record and provide written documentation of non-conformances with this EMPr that require Mandeni Municipality or its Contractor/s to implement corrective action. • Review preventative and corrective actions to ensure implementation of recommendations made from audits and site inspections. • Order the Contractor to suspend part or all of the works if the Contractor and/or any sub-contractors, suppliers, etc. fail to comply with any aspect of this EMPr. • Advise the Project Manager on actions or issues impacting on the environment and provide appropriate recommendations to address and rectify these matters. • Identify possible areas of improvement in the execution of the contract from an environmental perspective. • Assess the suitability and/or effectiveness of this EMPr on an on-going basis, in liaison with the Contractor/s and the Project Manager. Make recommendations accordingly. • Compilation of audit report / reporting on the compliance of the contractors & submission to the Project Manager and relevant authority as per EA conditions. • Monitor the processing of public complaints relating to the construction activities. • Ensure that revisions to this EMPr (as necessary) are communicated to the engineers' representative and the contractor and that they understand the requirements.
Community Liaison Officer (CLO)	<ul style="list-style-type: none"> • Ongoing communication with those people that are interested and affected parties (I&AP) by the project. • Notify registered and potentially interested I&AP of the availability of audit reports. • Create and maintain incident/ complaints register and make I&APs aware of the existence of the complaints book and the methods of communication available to them. • Inform neighbours of disruptive activities at least 24 hours before an activity is undertaken. • Inform neighbours of the existence of the hazardous storage area.

It is noted that this EMPr is not compiled on the assumption that a specific service provider will be auditing compliance, and therefore does not substitute a scope of work in terms of a contract.

5 Construction Phase and Operational Phase EMPr

The EMPr presented in this document details the mitigation measures identified for the project and delegates responsibilities for implementation of the mitigation activities. The EMPr, specifically the mitigation measures proposed, are intended to achieve the environmental objectives and address all the significant environmental impacts and risks identified in the Basic Assessment Report. The establishment of the necessary infrastructure and machinery on site will be done by the Contractor who will be responsible for implementing the majority of the activities, under the management of the PM.

All activities to be managed, mitigation and management measures to be implemented, and the responsible individuals/organisations who should implement these measures, are detailed in subsections which follow. This information is the core of this EMPr and must be adhered to at all times. The subsections which follow may be updated as necessary.

A Wetland Rehabilitation and Management Plan (WRMP), including an Alien Invasive Control and Management Plan (AIPCP) has been compiled for the proposed development (see Appendix D). This plan must be implemented as part of this EMPr.

5.1 Site Establishment and Preliminary Activities

Table 5-1: Site Establishment and Preliminary Activities

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
5.1.1 Access to Site				
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	a) Choice of access routes for construction vehicles will take into account minimum disturbance to wetland areas and residents neighbouring the site.	Contractor, PM	ECO	Once off during design and prior to the establishment of any transport routes
	b) Access to sensitive areas on the outskirts of the site will be restricted.	Contractor		Once off during staff induction and then policed during construction
	c) All areas of increased ecological sensitivity must be marked as such and kept off limits to all unauthorised construction and maintenance vehicles as well as personnel.			
	d) Impacts will be minimised by using existing roads where possible and avoiding the creation of new routes. If additional roads are required, then wherever feasible such roads must be constructed a distance from the wetland areas and not directly adjacent thereto. If crossings are required they must cross the system at right angles, as far as possible to minimise impacts in the receiving environment, and any areas where bank failure is observed due to the effects of such crossings must be immediately repaired by reducing the gradient of the banks to a 1:3 slope and where needed necessary, installing support structures. This should only be necessary if existing access roads are not utilised.	Contractor, PM		
	e) Disturbance to surrounding areas will be minimised by allowing sufficient space for turning areas.			
	f) Safe pedestrian crossings will be provided where necessary.			
5.1.2 Construction Camp and Storage Areas				
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	a) An environmental site management plan (ESMP) will be compiled in consultation with the ECO. This plan will show the positions and extent of all permanent and temporary site structures and infrastructure, including (where appropriate): <ul style="list-style-type: none">Contractors' camp and lay down areas.Excavations and trenches.Topsoil and spoil stockpiles.Waste material storage sites.Spoil areas.Solid waste storage and disposal sites.	Contractor, PM	ECO	Once off prior to site establishment

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
	<ul style="list-style-type: none"> Construction materials stores and batching sites. Site toilets and ablutions. Equipment stores. Hazardous waste storage sites. Fuel stores. 			
<u>Refer to impacts associated with site preparation prior to construction activities in Table 1-2</u>	b) Choice of the site for the Contractor's camp requires the Engineer's and ECO permission and will take into account location of local residents and sensitive environmental areas. Areas of natural vegetation must be avoided where possible.			
	c) The size of the construction camp will be minimised (especially where it is not possible to avoid natural vegetation or grassland).	Contractor, PM	ECO	Once off prior to site establishment and then actively managed throughout construction to avoid the area from expanding
	d) Temporary chemical toilets must be provided. Such toilets must be available for all site staff, both at the camp site, and on site. Ablution facilities must be located outside of delineated wetlands, outside of the 1:100year floodline, away from steep slopes and be protected from disturbance by natural elements. Open areas and the surrounding bush will not be used as ablutions.	Contractor, PM	ECO	Once off during site establishment with ongoing maintenance throughout construction
	e) Appropriate fire prevention facilities will be present at all storage facilities.			
	f) All construction camps, lay down areas, batching plants and any stores in general will be located outside of delineated wetlands. Choice of location for storage areas must take into account prevailing winds, distance to water bodies and general on-site topography.			Once off during site establishment with ongoing monitoring throughout construction
5.1.3 Waste Management Procedures				
<u>Refer to impacts associated with site preparation prior to construction activities in Table 1-2</u>	a) A fenced waste management area will be set up in accordance with the ESMP within the construction camp to store waste collected from the bins on site.	Contractor	ECO	Once off during site establishment with ongoing monitoring throughout construction
	b) Bins and / or skips <u>for waste</u> will be provided <u>within the construction camp</u> and <u>replaced when the bins and /or skips reach capacity</u> . Bins will be equipped with a closing mechanism to prevent their contents from blowing out and have liner bags for efficient control and safe disposal of waste. <u>Proof of disposal must be retained in the Environmental File for the duration of the construction period.</u>			
	c) Recycling and the provision of separate waste receptacles for different types of waste will be encouraged.			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	d) No hazardous waste may be stored in the open or around the work areas, close to streams or wetlands.			
5.1.4 Hazardous Materials Management				
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	The definition of hazardous substances / materials is those that are potentially: poisonous, flammable, carcinogenic or toxic (e.g. diesel, petroleum, oil, bituminous products, cement, solvent based paints, lubricants, explosives, drilling fluids, pesticides, herbicides, LPG).			
	a) Contractors will submit a method statement and plans for the storage of hazardous materials and emergency procedures.	Contractor, PM	ECO	Once off prior to the storage of any material
	b) Material Safety Data Sheets (MSDSs) will be readily available on site for all chemicals and hazardous substances, to be used on site. Where possible and available, MSDSs will also include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.			
	c) Staff dealing with hazardous materials / substances will be made aware of their potential impacts and will follow the appropriate safety measures and be provided with suitable Personal Protective Equipment or clothing.			Once off during site establishment with ongoing monitoring throughout construction
	d) Residents living adjacent to the construction site will be notified of the existence of the hazardous storage area(s).			
	e) When deciding on storage areas for hazardous substances the proximity of houses, schools etc. will be taken into account. Areas will be located away from sensitive areas such as within 1:100 year floodline of any river or wetland areas.			
	f) Hazardous storage and refuelling areas will be bunded with an impermeable liner to protect groundwater quality.			
	g) Fuel tanks will meet relevant specifications and be elevated so that leaks may be easily detected.	Contractor	ECO, PM	
	h) Storage areas containing hazardous substances / materials will be clearly signed.			
	i) Surface water draining off contaminated areas containing oil and petrol will be channelled towards a sump to separate these chemicals and oils.	Contractor, PM	ECO	
	j) Spillages will be cleaned up immediately and contaminants properly drained and disposed of using appropriate solid/hazardous waste facilities (not to be			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
	disposed of within the natural environment). Any contaminated soil from the construction site will be removed and disposed of at a registered facility, and the spillage site rehabilitated timeously and appropriately.			
5.1.5 Education of Site Staff on General and Environmental Conduct				
<u>Refer to impacts associated with site preparation prior to construction activities in Table 1-2</u>	a) The site foreman will receive environmental training on the provisions contained in this EMPr (i.e. construction induction), the EA and basic environmental awareness information. The foreman will have sufficient understanding to pass this information on to the construction staff.	PM, Contractor, ECO	ECO	Once off during site establishment
	b) All construction personnel will undergo environmental training prior to commencement of work on site. Proof of the training will be retained in the site environmental file for auditing purposes.	Contractor	ECO	Once off during site establishment and throughout construction when new contractors are appointed
	c) Provision will be made for environmental issues on the agenda of the monthly construction project meetings.	PM, Contractor	ECO	Throughout construction
	d) A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers will be made aware of the following general rules: <ul style="list-style-type: none"> i. No alcohol / drugs to be present on site. ii. No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel). iii. Prevent excessive noise. iv. Bringing pets onto site is forbidden. v. No harvesting of firewood, muthi plants, crops or any other natural material from the site or from the areas adjacent to it. vi. The hunting of birds and animals (including the use of snares) on site and in surrounding areas is forbidden. vii. Construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives. (e.g.: fires for cooking; the use of surrounding bush as a toilet facility is forbidden). viii. Trespassing on private / commercial properties adjoining the site is forbidden. ix. Driving under the influence of alcohol is prohibited. x. Access to wetland areas is restricted. xi. Other than pre-approved security staff, no workers shall be permitted to live on site. 	Contractor	ECO	Once off during staff induction with ongoing monitoring throughout construction
5.1.6 Storm Water				
<u>Refer to impacts associated with site</u>	a) A storm water management plan will be compiled and approved by the Engineer prior to commencement of construction.	Contractor, PM	ECO	Once off prior to site establishment

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
<u>preparation prior to construction activities in Table 1-2</u>				
5.1.7 Social Impacts – Visual & Noise				
<u>Refer to Socio-economic impacts in Table 1-2</u>	a) Contractors will be expected to maximise the employment of individuals with the required skills residing in the adjacent communities.	Contractor, CLO	ECO	Once off during site establishment and throughout construction when new contractors are required
	b) Mandeni Municipality will make use of local construction companies as far as possible. Contractors outside of the area will only be used to provide skills not readily available in the area.			
	c) A CLO will be appointed and will be responsible for ongoing communication with I&APs. This includes explaining the construction process and answering any questions/complaints, as may be required.	PM	ECO	Once off prior to site establishment
	d) An incident/ complaints register will be housed at the site office and managed by the CLO. This register will have numbered pages and any missing pages will be accounted for by the Contractor/CLO. This register will be tabled during monthly project team meetings.	Contractor, CLO	ECO	Throughout construction
	e) The CLO will make I&APs aware of the existence of the complaints book and the methods of communication available to them.	CLO	ECO	Once off during site establishment
	f) Queries and complaints will be handled as follows: <ul style="list-style-type: none"> • Document details of such communications. • Submit these for inclusion in incident/ complaints register. • Bring issues to Contractor/Engineer's attention immediately. • Take remedial action as per Engineer's instruction. 			Throughout construction, as and when required
	g) The Contractor/CLO will inform neighbours in writing of disruptive activities at least 24 hours beforehand. This will take place by way of leaflets distributed or notice boards at affected sites giving the Engineer's, Contractor's and CLO's details or other method approved by the ECO.	Contractor /CLO	ECO	As and when required throughout construction
	h) The CLO will Notify registered and potentially interested I&AP of the availability of audit reports.	CLO, PM	ECO	Within 7 days of each audit report
	i) Construction vehicles will be fitted with standard silencers prior to the beginning of construction.	Contractor	ECO	Once off prior to construction and ongoing for any new equipment brought to site
	j) Equipment that is fitted with noise reduction facilities (e.g. Side flaps, silencers etc.) will be used as per operating instructions and maintained properly during site operations.	Contractor	ECO	Ongoing

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
	k) The site will be kept clean to minimise the visual impact of the site. Storage facilities, elevated tanks and other temporary structures on site will be located such that they have as little visual impact on local residents as possible.	Contractor	CLO /ECO	Once off during staff induction with ongoing monitoring throughout construction
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	l) Lighting will be positioned so that it does not pose a nuisance to residents or a danger to road users while still allowing for maximum security.			
5.1.8 Wetland Habitat				
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	a) The delineated wetlands and 32m NEMA Zone of Regulation (ZoR) must be clearly demarcated with danger tape by an ECO and marked as a 'no-go' area where no construction activities are planned.	Contractor, PM	ECO	Once off during site establishment with ongoing monitoring throughout construction
5.1.9 Heritage Environment				
Refer to Socio-economic impacts in Table 1-2	a) Prior to the commencement of construction, all staff will be trained on what possible archaeological or historical objects of value may look like, and to notify the Engineer should such an item be uncovered.	Contractor, CLO	ECO	Once off during site establishment and throughout construction when new contractors are required
5.1.10 Development and Operational Footprint				
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	a) Planning of any additional infrastructure or relocating the infrastructure footprint must be undertaken with consideration of the sensitivity maps (provided in Appendix A).	Contractor, PM	ECO	Once off during site establishment with ongoing monitoring throughout construction
	b) All development footprint areas must remain as small as possible and must not encroach onto surrounding more sensitive areas. It must be ensured that the wetlands and the associated regulatory zones are off-limits to construction vehicles and personnel.			
	c) The boundaries of footprint areas are to be clearly defined and it must be ensured that all activities remain within defined footprint areas.			
	d) All areas of increased ecological sensitivity must be marked as such and be off limits to all unauthorised construction and maintenance vehicles and personnel.			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
	e) The duration of impacts on the freshwater system must be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised.			
	f) Edge effects of activities, particularly erosion and alien/weed control need to be strictly managed.			


5.2 Management of Construction Activities and Workforce

Table 5-2: Management of Construction Activities and Workforce

Impact	Management / Mitigation Measures	Implementation	Monitoring	Frequency
5.2.1 Access to Site				
Refer to impacts associated with Ground-breaking and earthworks in Table 1-2	a) Existing roads will be used where possible, avoiding the creation of new routes. Any additional routes and turning areas required by the contractor will be approved by the ECO, in writing based on the route map that will be retained as part of the environmental file. Disturbance to surrounding areas will be minimised by allowing sufficient space for turning areas.	Contractor, PM	ECO	Ongoing throughout construction
	b) Speed limits (30 km/hr on dirt roads) will be enforced at all times, and traffic control provided both on public roads and onsite roads.			
	c) Only authorised roads and access routes will be used. Where construction will obstruct existing access, alternative temporary access routes will be allowed for. Access routes to be designed in order to minimize impact on wetland areas and the general environment.			
	d) All access routes and roads will be adequately maintained in order to minimise erosion and undue surface damage. Rutting and potholing will be repaired and stormwater control mechanisms will be maintained.			
	e) Runoff from roads will be managed to avoid erosion and pollution problems.			
	f) Any gravel or cement spillage on roads will be cleaned up in the same day in which the spill occurred.			
	g) Any damage to public or private roads caused by the Contractor during the construction phase will be repaired.			
5.2.2 Maintenance of Construction Camp				
Refer to impacts associated with Stormwater Management and Ground-breaking and earthworks in Table 1-2	a) Run-off from the camp site will not discharge into neighbours' properties.	Contractor	ECO/ CLO	Ongoing throughout construction
Refer to impacts associated with Stormwater Management	b) The drainage of the camp site will be monitored and managed to avoid standing water and soil erosion.		ECO	
	c) Ablutions will be maintained in a clean state with proof of servicing of chemical toilets kept in the file on site. Ablutions will be moved where appropriate to ensure that they			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
	adequately service the work areas. Open areas and the surrounding bush will not be used as ablutions.			
Refer to impacts associated with Stormwater Management	d) The construction camp and working areas will be kept clean and tidy at all times.			
	e) Eating areas must be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.			
5.2.3 Staff Conduct				
Refer to impacts associated with site preparation prior to construction activities in Table 1-2	a) Conduct of staff will be monitored to ensure that the induction training they received regarding the EMPr and environmental practices are adhered to.	Contractor	ECO	Ongoing throughout construction
5.2.4 Air quality control				
Refer to impacts associated with Ground-breaking and earthworks in Table 1-2	a) The production of dust and damage caused by dust will be limited through regular watering of the work areas. Where dust is unavoidable in residential or commercial areas, screening will be required utilising, for e.g. wooden supports and shade cloth.	Contractor	ECO	From the start of site establishment through to the completion of construction
Refer to impacts associated with Site preparation prior to construction activities and Ground-breaking and earthworks in Table 1-2	b) Stripping of vegetation and existing material will be limited to necessary working areas. Retain as much indigenous vegetation as possible outside of the authorised footprint areas.			
	c) Vehicles and machinery will be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption etc. Should excessive emissions be observed, the Contractor will have the equipment repaired as soon as possible. This will include reducing emissions from the equipment and adjusting any load it may be carrying.			
Refer to impacts associated with Ground-breaking and earthworks in Table 1-2	d) Lime, concrete and other powders must not be mixed during excessively windy conditions.			
5.2.5 Storm water, soil erosion and stockpile areas				
Refer to impacts associated with Stormwater Management	a) Construction activities must minimise the duration of exposure to bare soils on site.	Contractor	ECO/ PM	Ongoing throughout construction

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
<u>Refer to impacts associated with Site preparation prior to construction activities and Stormwater Management in Table 1-2</u>	<p>b) Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities must be put on hold. In this regard, the contractor must be aware of the weather forecast.</p> <p>c) All stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor shall avoid stockpiling materials in vegetated areas that will not be cleared.</p>			
<u>Refer to impacts associated with Ground-breaking and earthworks, and Stormwater Management in Table 1-2</u>	<p>d) All stockpiles must not exceed 2m in height and be located at least 10 m from the delineated wetlands. Stockpiling of removed materials may only be temporary (i.e. may only be stockpiled during the period of construction at a particular site) and must be disposed of at a registered waste disposal facility.</p> <p>e) Wind screening and stormwater control will be undertaken around stockpiles to prevent soil loss from the site.</p>			
<u>Refer to impacts associated with Stormwater Management</u>	f) Stockpiled soil must be kept free of weeds and shall not to be compacted.			
<u>Refer to impacts associated with Ground-breaking and earthworks in Table 1-2</u>	g) The removed vegetation must be stockpiled outside of the delineated boundary of the wetlands. The footprint areas of these stockpiles must be kept to a minimum. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site			
<u>Refer to impacts associated with Ground-breaking and earthworks, and Stormwater Management in Table 1-2</u>	<p>h) Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of the soil.</p> <p>i) Trench dewatering, if required, will be done in such a manner that water does not result in concentrated flow that could cause soil erosion.</p> <p>j) Given the topography of the site, silt traps (see Plate 1) must be installed downgradient of the construction works to limit any sediment entering the downgradient wetland areas. Sediment traps must allow for surface runoff should a rainfall event occur.</p>			
	k) Berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the embankments.	Contractor	ECO/ PM	Ongoing throughout construction

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
	 <p>Plate 1: Example of the installation of geotextile sediment traps to be used during the construction phase, to limit additional sediment from entering the downstream portion of the wetland</p> <p>l) After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately.</p> <p>m) All exposed soil, including stockpiles, must be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) in order to prevent excessive dust generation, erosion and sedimentation of the receiving freshwater environment.</p>			
Refer to impacts associated with Ground-breaking and earthworks, and Stormwater Management in Table 1-2	n) Topsoiling and revegetation shall commence immediately after the completion of an activity and at an agreed distance behind any particular work front. If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, rows of silt fences and sandbags of vegetation must be established along contours at regular intervals to capture eroded sand.	Contractor	ECO/ PM	Immediately after the completion of an activity
5.2.6 Water Quality				
Refer to impacts associated with Ground-breaking and earthworks in Table 1-2	a) Discharge of water containing polluting matter or visible suspended materials directly into drainage lines or wetland areas will be prohibited.	Contractor	ECO	Ongoing throughout construction
Refer to impacts associated with Site preparation prior to construction activities and Ground-breaking	b) No vehicles will be washed on site and vehicles are to be serviced at the contractor laydown area. All re-fuelling is to take place outside of the delineated wetlands and 32m NEMA ZoR.			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
<u>and earthworks in Table 1-2</u>				
<u>Refer to impacts associated with Ground-breaking and earthworks in Table 1-2</u>	c) No hydrocarbons (oil or fuel etc.) will be allowed to enter sewers, storm water drains or the natural environment. Any accidental oil or fuel spills or leakages will be immediately cleaned with an approved absorbent material, such as 'Drizit' or 'Spill-sorb'. Sand can also be used. Any contaminated soil will be removed to the depth of the contamination. The contaminated material must be disposed of via the hazardous waste disposal stream. Any hydrocarbon spill constitutes an incident that will be captured on the incident/complaints register.			
<u>Refer to impacts associated with Site preparation prior to construction activities and Ground-breaking and earthworks in Table 1-2</u>	d) Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities.			
<u>Refer to impacts associated with Ground-breaking and earthworks in Table 1-2</u>	e) Municipal water (or another source approved by the Engineer) must be used for all activities such as dust suppression, concrete mixing, compacting etc.	Contractor	ECO	Ongoing throughout construction
5.2.7 Alien Plant Species				
<u>Refer to impacts associated with Ground-breaking and earthworks and Installation of water pipeline, irrigation line and sewer line in Table 1-2</u>	a) Proliferation of alien and invasive species is expected within any disturbed areas. These species must be eradicated and controlled to prevent their spread beyond the project footprint, particularly as the study area is located within a sensitive area. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled. b) Removal of the alien and weed species encountered on the property must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) and Section 28 of the National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA)). Removal of species must take place throughout the construction, operational, closure/decommissioning and rehabilitation/ maintenance phases.	Contractor/ PM	ECO	Ongoing throughout construction
<u>Refer to impacts associated with Ground-breaking and earthworks and Installation of water</u>	c) Species specific and area specific eradication recommendations: <ul style="list-style-type: none"> Care must be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used. Footprint areas must be kept as small as possible when removing alien plant species. 			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	<u>Implementation</u>	<u>Monitoring</u>	<u>Frequency</u>
<u>pipeline, irrigation line and sewer line in Table 1-2</u>	<ul style="list-style-type: none"> No vehicles should be allowed to drive through designated sensitive drainage line and riparian areas during the eradication of alien and weed species. 			
5.2.8 Materials Management				
<u>Refer to impacts associated with Ground-breaking and earthworks and Installation of water pipeline, irrigation line and sewer line in Table 1-2</u>	a) Fresh concrete and cement mortar must not be mixed within 10 m of the identified wetlands. Mixing of cement may be done within the construction camp, may not be mixed on bare soil, and must be within a lined, bound or bunded portable mixer. Consideration must be taken to use ready mix concrete. b) No mixed concrete shall be deposited directly onto the ground whilst it awaits placing. A batter board or other suitable platform/mixing tray is to be provided onto which any mixed concrete can be deposited whilst it awaits placing. c) Cement bags must be disposed of in the demarcated hazardous waste receptacles and the used bags must be suitably disposed of. d) Spilled or excess concrete must be disposed of at a suitable landfill site. e) Cement products/wash will not to be disposed of or allowed to discharge into the natural environment. f) Inert building rubble and waste rock will be stored in areas designated for such g) Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface that is contained by temporary or permanent bunds. Mixing / decanting will not be permitted within wetland areas. Waste from these must then be disposed of to a suitable waste site.	Contractor	ECO/PM	Ongoing throughout construction
5.2.9 Waste Management Procedures				
Non-hazardous Solid Waste				
<u>Refer to impacts associated with Ground-breaking and earthworks in Table 1-2</u>	a) Dumping of waste of any nature, or any foreign material will not be permitted b) Store rubble and waste rock as indicated on the approved ESMP. Rubble and waste rock will be disposed of at the discretion of, and with the permission of the ECO at the nearest registered solid waste disposal facility. Proof of safe disposal will be retained for inspection during audits. c) All remains of excess cement and concrete will be disposed of in the approved manner after the completion of tasks. Solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder will be treated as hazardous waste. d) All domestic waste will be collected in adequate numbers of litter bins located as required on the Works Site and within the Contractors camp.	Contractor	ECO	Ongoing throughout construction

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
	<p>e) Where feasible, collected waste paper, glass and metal will be collected separately and either collected by or delivered to registered recyclers. Proof of safe disposal will be retained for inspection during audits.</p> <p>f) Litter in and around the work area will not be permitted. Litter bins will be equipped with a closing mechanism to prevent their contents from blowing out, will be emptied weekly and staff will be required to use these bins at all times.</p> <p>g) No solid waste will be burned or buried on site but will be removed from site weekly or fortnightly and disposed of at an appropriately licenced disposal facility. Skips will be emptied prior to over-flowing. The excavation and use of rubbish pits on site is forbidden. Proof of safe disposal will be retained for inspection during audits.</p> <p>h) Solid waste will be transported properly whereby waste spills en-route will be avoided. Tarpaulins or similar mechanisms can be used to prevent spillages.</p>			
Hazardous waste (includes oils, chemicals, fuels, paints, batteries, lubricants, wet cement and liquid slurry etc.)				
Refer to impacts associated with Ground-breaking and earthworks, and Stormwater Management in Table 1-2	<p>i) Hazardous waste will be stored appropriately to ensure that it does not pollute the environment. Designated skips will be provided across the site to store hazardous waste.</p> <p>j) Hazardous waste not earmarked for reuse, recycling or resale will be disposed of at a registered hazardous waste disposal site. Skips will be emptied prior to over-flowing. Proof of safe disposal will be retained for inspection during audits</p>	Contractor	ECO	Ongoing throughout construction
5.2.10 Social Impacts – Visual & Noise				
Refer to Socio-economic impacts in Table 1-2	<p>a) Lighting on the construction site will be designed to avoid impacting on traffic and nearby houses.</p> <p>b) Visual impact of the site will be reduced by ensuring the site is neat at all times</p> <p>c) All staff and contractors in site will conduct themselves in an acceptable manner to ensure that the disturbance to surrounding residents is minimised.</p>	Contractor	ECO	Ongoing throughout construction
	<p>d) Noise impacts will be reduced by maintaining normal working hours (07h00 to 17h00, Mondays to Fridays) and should after hours construction work be required adjacent landowners will be notified 24 hours prior to the activity.</p> <p>e) A complaints register will be housed at the site office and managed by the CLO. This will have numbered pages and any missing pages will be accounted for by the Contractor/ CLO. This register will be tabled during monthly project site meetings.</p>	Contractor/ CLO	ECO	Ongoing throughout construction
5.2.11 Cultural Environment				
	a) Amafa will be contacted if any archaeological or heritage objects are identified during earthmoving activities and all development must cease until further notice. Should an	CLO	ECO	Ongoing throughout construction

Impact	Management / Mitigation Measures	Implementation	Monitoring	Frequency
Refer to Socio-economic impacts in Table 1-2	object be identified during the construction phase, the chance find protocol must be implemented.			
	b) The following procedure will be undertaken should any graves, not previously identified by the community during the planning phase, be identified during construction: 1. Construction will cease immediately. 2. The findings will be reported to the local police station. 3. The findings will be reported to Amafa to investigate (Ms Bernadet Pawandiwa – telephone: 033 3946 543).	Contractor	ECO/ CLO	During construction
5.2.12 Wetland Habitat				
Refer to impacts associated with Site preparation prior to construction activities; Ground-breaking and earthworks; Installation of water pipeline, irrigation line and sewer line; and Stormwater Management in Table 1-2	a) Ensure measures are implemented to prevent dirty runoff water entering the receiving freshwater environment.	Contractor	ECO	Ongoing throughout construction
	b) Ensure where necessary, exposed soil in the vicinity of wetland habitat is protected from erosion by means of reinstating natural vegetation following construction, or installation of an appropriate commercially available product such as Geojute or MacMatR.			
	c) Permit only essential construction personnel within 32m of the wetlands, if absolutely necessary that they enter the regulatory zone.			
	d) Limit the footprint area of the construction activities to what is absolutely essential in order to minimise environmental damage.			
	e) During the construction phase, no vehicles must be allowed to indiscriminately drive through the wetland or riparian areas.			
	f) The characteristics of the wetlands could potentially be altered locally, if construction materials, such as rock and rubble created during construction which is likely to have sharp edges (and not the smooth surfaces typically associated with river rocks and pebbles) are not prevented from entering these features. Such material must therefore be prevented from entering the cryptic wetlands or within 50m thereof, and all construction related waste must be removed from the study area once construction has been completed.			
	g) Implement effective waste management in order to prevent construction related waste from entering the freshwater environments.			
5.2.13 Soil				
Refer to impacts associated with Site preparation prior to construction activities and	a) To prevent the erosion of soil, management measures may include berms, soil traps, hessian curtains and stormwater diversion away from areas particularly susceptible to erosion.	Contractor	ECO	Ongoing throughout construction
	b) Install erosion berms during construction to prevent gully formation. Berms every 50m must be installed where any disturbed soil has a slope of less than 2%. every 25m where			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
<u>Ground-breaking and earthworks in Table 1-2</u>	the track slopes between 2% and 10%, every 20m where the track slopes between 10% and 15% and every 10m where the track slope is greater than 15%.			
	c) Sheet runoff from access roads must be slowed down by the strategic placement of berms and sandbags.			
	d) As far as possible, all construction activities must occur in the low flow season, during the drier winter months. However, construction activities in the valley head seep wetland must only occur during the drier winter months.			
	e) Monitor all areas for erosion and incision, particularly any riparian crossings. Any areas where erosion is occurring in an excessively rapid manner must be rehabilitated as quickly as possible and in conjunction with other role players in the catchment.			
5.2.14 Construction within the Valley Head Seep Wetland				
<u>Refer to impacts associated with Ground-breaking and earthworks in Table 1-2</u>	a) In order to create the proposed terrace for the sports field all vegetation will need to be cleared. All indigenous vegetation can be stockpiled and mulched, to be used as organic matter during the rehabilitation phase. All exotic or alien vegetation must be removed from the watercourse and disposed of at a registered facility.	Contractor	ECO	Ongoing throughout construction
	b) As far as feasibly possible, imported material used for infilling and terracing of the proposed sports field development must be free of weeds and alien and invasive vegetation species seeds.			
	c) The first 10 cm of topsoil must be stripped and stockpiled for reuse once the proposed terrace has been shaped and the wetland has been re-sloped.			
	d) The proposed terrace must be designed in such a way that there are no steep slopes which may limit vegetation growth and result in erosion. A maximum slope with 1:4 is considered the most appropriate balance between reducing footprint and ensuring slopes are stable.			
	e) It must be ensured that there is no impedance to stormwater that is released into the valley head seep wetland and that all stormwater is suitably managed.			
	f) The area must be suitably compacted to prevent any erosion or preferential flow paths from occurring.			
	g) No hard infrastructure is allowed within the reshaped area and use of hard engineering structure (such as gabion retention structures or reno-mattresses) must be avoided as far as feasibly possible.			
	h) It is recommended that a post and wire fence be utilised for the proposed fence line. Although ClearVu fencing is suitable for security as it cannot be easily removed or cut, it does limit the movement of fauna (with only insects and avifaunal species able to navigate it). If ClearVu is desired a suitable faunal specialist must assist in designing under tunnels for larger faunal species (such as porcupine).			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
Refer to impacts associated with Ground-breaking and earthworks in Table 1-2	i) No formal paving must be used for the proposed walkway. In situ compaction of soil or bark mulch could be utilised (for example see Figure below).			
	j) Revegetation of the areas surrounding the walkways with suitable indigenous species of the Indian Ocean Coastal is recommended.	Contractor	ECO	Ongoing throughout construction
5.2.15 Trenching				
Refer to impacts associated with Ground-breaking and earthworks and Installation of water pipeline, irrigation line and sewer line in Table 1-2	a) During trenching, soil may be stockpiled on the upgradient edges of the excavation in order to limit potential sedimentation of the downgradient wetlands. b) Mixture of the lower and upper layers of the excavated soil must be kept to a minimum. The soil must be used to backfill the trenches, immediately after inserting the pipeline. c) The stockpiles must remain as small as possible and may not exceed 2m in height.	Contractor	ECO	Ongoing throughout construction
5.2.16 Rehabilitation Measures for Wetlands (refer to Appendix A)				
Refer to impacts associated with Site preparation prior to construction activities; Ground-breaking and earthworks; Installation of water pipeline, irrigation line and sewer line; and Stormwater Management in Table 1-2	a) A suitably qualified specialist has compiled an alien invasive vegetation plan (refer to Appendix D). This plan will be implemented to eradicate as far as possible all alien floral species which are identified within wetland areas.	Contractor	ECO	Ongoing and prior to conclusion of construction
	b) Re-introduction of indigenous vegetation, in particular, graminoid species and sedges where vegetation is sparse. Manure sourced from local farmers is likely to contain seeds of naturally occurring floral species, and this could be utilised in the rehabilitated areas to further encourage growth of indigenous flora.			
	c) Erosion control within the wetlands and their buffer zones in order to prevent sedimentation, enable natural vegetation to become re-established, and improve water quality. Examples of possible management methods include monitoring of access by domestic livestock, protection of small areas of exposed soils with suitable geotextiles or organic material (e.g., branches) until such time as vegetation is re-established, appropriate stormwater management practices and installation of erosion berms.			
	d) Indiscriminate grazing practices and crop cultivation bordering the wetlands are widespread in the surrounding community and are largely responsible for the poor condition of the vegetation communities of the wetlands. Education of the local community about sustainable grazing practices.			

5.3 Post Construction Activities

Table 5-3: Management of Post Construction Activities

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
5.3.1 Construction Camp				
<u>Refer to impacts associated with Site preparation prior to construction activities; Ground-breaking and earthworks; Installation of water pipeline, irrigation line and sewer line; and Stormwater Management in Table 1-2</u>	a) All leftover building materials must be returned to the depot or removed from the site.	Contractor	PM, ECO	Once off prior to leaving the site
	b) Any access roads created will be rehabilitated to their condition prior to the start of construction.			
	c) Any infrastructure (gates, fences, etc) impacted on by construction activities will be returned to the same or better condition than prior to the start of construction.			
	d) Once construction infrastructure has been removed spills not previously evident may become visible. These spills will be appropriately addressed and any contaminated material removed from the site and disposed of offsite at an appropriately licensed disposal facility.			
	e) All construction plant, equipment, storage containers, temporary fencing, temporary services, temporary storage (including fuel stores and other bundled hazardous material storage area) fixtures and any other temporary works will be cleared and completed removed from the site unless otherwise agreed with community members who will take ownership of these materials/ equipment.	CLO, Contractor		
5.3.2 Rehabilitation				
<u>Refer to impacts associated with Site preparation prior to construction activities; Ground-breaking and earthworks; Installation of water pipeline, irrigation line and sewer line; and Stormwater Management in Table 1-2</u>	a) All soil compacted as a result of construction activities falling outside of project footprint areas must be ripped and profiled. Special attention must be paid to alien and invasive control within these areas. Alien and invasive vegetation control must take place throughout all construction and rehabilitation phases to prevent loss of floral habitat.	Contractor	ECO, PM	Once off prior to leaving site
	b) Rehabilitate all wetland habitat areas affected by construction to ensure that the ecology of these areas is re-instated during all phases. In this regard, special mention is made of the need to stockpile soil separately during the construction and/or operation phase where relevant in order for these soil to be utilised during the rehabilitation phase.			
	c) Edge effects of activities including erosion and alien/ weed control need to be strictly managed in these areas.			
	d) As far as possible, all rehabilitation activities must occur in the low flow season, during the drier winter months. However, construction activities in the valley head seep wetland must only occur during the drier winter months.			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
<u>Refer to impacts associated with Site preparation prior to construction activities; Ground-breaking and earthworks; Installation of water pipeline, irrigation line and sewer line; and Stormwater Management in Table 1-2</u>	e) As much vegetation growth (of indigenous/endemic floral species) as possible must be promoted within the proposed development area in order to protect soil.			
	f) All alien vegetation must be removed from rehabilitated areas and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist).			
	g) All areas affected by construction and operation must be rehabilitated upon completion of the specific construction and operation activity throughout the life of the development.			
	h) Wetland vegetation cover must be monitored to ensure that sufficient vegetation is present to bind the soil and prevent erosion and incision.	Contractor	ECO, PM	Once off prior to leaving site
	i) A detailed rehabilitation plan must be developed by a suitably qualified ecologist prior to commencement of the operations phase in order to address specific rehabilitation requirements.			
5.3.3 Waste				
<u>Refer to impacts associated with Site preparation prior to construction activities; Ground-breaking and earthworks; Installation of water pipeline, irrigation line and sewer line; and Stormwater Management in Table 1-2</u>	a) All waste including building rubble, litter, domestic waste, spilled concrete, unusable building materials, skips and bins will be removed (unless by prior arrangement with the owner of the property on which the waste is located) from the site and appropriately disposed of. Certificates of safe disposal will be maintained for inclusion in the closure audit report.	Contractor	ECO	Prior to leaving the site

5.4 Operational Activities

Table 5-4: Management of Operational Activities

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
5.4.1 Small-scale rehabilitation				
<u>Refer to impacts associated with Small-scale rehabilitation of the area in Table 1-2</u>	a) Following construction, <u>the</u> alien invasive management plan (<u>Appendix D</u>) must be implemented to ensure that alien invasive plant species do not become established within the areas disturbed by construction activities.	PM	ECO	Ongoing throughout operation
	b) Rehabilitation of the wetlands must be undertaken, including clearing of all alien and invasive vegetation and reinstatement of indigenous wetland vegetation (particularly for the valley head seep wetland where portions of the proposed main soccer field are proposed.			
	c) It is considered advantageous if the impacted areas adjacent to the wetlands be rehabilitated with indigenous terrestrial vegetation to create an open space corridor and reinstate the ecological buffer to the wetlands.			
	d) The wetlands must be monitored for alien and invasive vegetation encroachment and all alien vegetation/weeds must be removed according to a suitable alien vegetation control plan. Annual follow up must be undertaken to the wetlands for at least 3 years post construction.			
	e) Where applicable for the eradication of alien and invasive vegetation, care must be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used and water contamination is avoided.			
5.4.2 Operation of the sports field				
<u>Refer to impacts associated with Operation of the Sports Facility in Table 1-2</u>	a) Adequate stormwater run-off measures must be put in place and no stormwater may be directly released into the wetland. Attenuation ponds and/or sustainable drainage systems (SuDs) must be installed to assist with water “polishing” and reducing the velocity of water before entering the wetlands. This will ensure no erosion or scouring occurs as a result of stormwater inputs.	PM	ECO	Ongoing throughout operation
	b) Incorporate as much indigenous terrestrial and wetland vegetation into the open space areas, Sustainable Drainage systems (SuDS), and stormwater attenuation facilities (where applicable) associated with the proposed sports field development.			
	c) Any spills to be immediately cleaned up and treated accordingly.			
	d) No vehicles are permitted to enter into the freshwater ecosystems. Any maintenance works must be undertaken by foot or the relevant authorisations obtained beforehand.			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
5.4.3 Operation of the water pipeline				
<u>Refer to impacts associated with Operation of the proposed water pipeline in Table 1-2</u>	a) It is recommended that the integrity of the water pipelines be tested at least once every five years or more often should there be any sign of a leak.	PM	ECO	Once every 5 years
	b) An emergency plan must be compiled and implemented, to ensure a quick response and attendance to the matter in case of a leakage or bursting of the pipeline.	PM	ECO	Once off prior to operation and ongoing monitoring throughout operation
5.4.4 Operation and maintenance of conservancy tanks and associated infrastructure				
<u>Refer to impacts associated with Operation and maintenance of conservancy tanks and associated infrastructure in Table 1-2</u>	a) Regular monitoring of the conservancy tanks and associated infrastructure must be undertaken to allow for pro-active management, including regularly inspection of all conservancy tanks to ensure they do not leak.	PM	ECO	Ongoing throughout operation
	b) Care must be taken when servicing the conservancy tanks, making sure that no litter or runoff from the servicing of the conservancy tank enters the wetland.			
	c) In the event of that the following warning signs are noticed during regular inspection, contact a professional septic company/preferred installer immediately for assistance: <ul style="list-style-type: none">• Surfacing sewerage or wet spots.• Gurgling sounds in the plumbing system.• Slow draining fixtures.			
5.4.5 Monitoring of the sewer and water pipelines, and operation of the stormwater management system				
<u>Refer to impacts associated with Monitoring of the sewer and water pipelines, and operation of the stormwater management system in Table 1-2</u>	a) All wetlands are to be considered "off limits" to any vehicular activity.	PM	ECO	Ongoing throughout operation
	b) Disturbances to the wetlands must be limited to what is essential for long-term maintenance in line with the mitigation measures presented herein.			
	c) Existing access roads must be used for monitoring purposes. No indiscriminate movement of vehicles is allowed as this would result in the compaction of soil and potential loss of wetland and instream habitat.			
	d) The likelihood of erosion is reduced due to a higher surface roughness of SuDs (earth swales), allowing for water to enter the wetlands at a lower velocity.			
	e) The SuDs must be inspected regularly to ensure proper functioning, monitoring of erosion and clearing of any debris or litter in the SuDs.			
	f) Regular inspection of the stormwater outlet structures must be undertaken to monitor the occurrence of erosion. If erosion has occurred, it should immediately be rehabilitated by means of revegetation.			
	g) Water will be diverted around the soccer field in earth cut off trenches and stone pitched swales will be sued to discharge wate into the wetland in an attenuated manner.			

<u>Impact</u>	<u>Management / Mitigation Measures</u>	Implementation	Monitoring	Frequency
<u>Refer to impacts associated with Monitoring of the sewer and water pipelines, and operation of the stormwater management system in Table 1-2</u>	h) Hot spots for the build-up of debris and excess sediment within the wetlands must be identified and when necessary, debris/excess sediment must be removed by hand to prevent future flooding and potential damage to infrastructure. In this regard, special mention is made of periods following high rainfall and subsequent high instream water volumes. Removal of debris must be undertaken in line with the above listed construction mitigation measures.			
	i) Any erosion or gully formation must be identified on an ongoing basis and re-profiled and revegetated accordingly.			

6 Auditing

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. In the event where discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes. Mandeni Municipality is to appoint an independent auditor to undertake such audits i.e. the ECO. An audit of the environmental monitoring and management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the construction phase of the project to ensure adherence to the management measures contained in the EMPr. During the construction phase the duties and responsibilities of the ECO are to include for but not limited to the under-mentioned:

- Conduct a site visit prior to the commencement of construction.
- Fortnightly audit site visits to be conducted with associated written rapid feedback.
- Auditing should measure environmental compliance for the various activities defined in this EMPr and the EA.
- Prepare a monthly audit report detailing the findings and measures taken to mitigate non-compliance findings.
- Audit reports to be circulated to client, Project Manager and contractor to action any remedial work required on site.
- Audit report is to be submitted to EDTEA.
- All registered I&AP and potential I&AP to be informed of the submission of the audit report to EDTEA.
- Attend monthly project team meetings to discuss issues identified and remediation actions required.
- Conduct a site visit at the end of the construction period to ensure that all remedial work is completed.
- Compile and submit a comprehensive final close out audit report, before the contractor vacates the site to ensure all remedial work, site clearance and rehabilitation is completed as required.

7 Corrective Action

Performance measurement is an essential part of the EMPr. Key purposes of performance measures are to:

- Determine whether the EMPr has been implemented appropriately.
- Check that risk controls have been implemented and are effective.
- Learn from the system failures through incident investigations.
- Provide information that can be used to review and, where necessary, improve aspects of the system.

There are several levels at which corrective action can be implemented. These are listed and described below:

i) Verbal Instruction

Verbal instructions are likely to be the most frequently used form of corrective action and are given in response to minor transgressions that are evident during routine site inspections. Verbal instructions are also used to create further awareness amongst Contractor workforce, as often the transgressions are a function of ignorance rather than vindictiveness.

ii) Written Instructions

Written instructions will be given following an audit. The written instructions will indicate the source or sources of the problems and proposed solutions to those problems. The implementation of these solutions will be assessed in a follow-up audit and further written instructions issued if required.

At the employer representative's sole discretion, a penalty shall be deducted to remedy issues if written instructions are ignored. Should a contractor not remedy and rehabilitate impacted areas after an environmental incident to the satisfaction of the employer's representative, then the employer's representative shall carry out the necessary actions. Costs to remedy environmental incidents as well as rehabilitation of impacted areas shall be paid by the Contractor/s concerned.

iii) Contract Notice

A contract notice is a more extreme form of written notice because it reflects the transgressions as a potential breach of contract.

If there is not an adequate response to a contract notice, then the next step can be to have the contractor removed from the site and the contract cancelled.

8 Amendments

Amendments to the EMPr may be required as the project phase proceeds. Any proposed amendments to the EMPr, as may be specified in the audit reports, will be confirmed with the PM prior to being issued as a formal amendment, subsequent to approval by the EDTEA. Copies of the amendments will be issued to recipients of this report as detailed in the report record at the end of this document and forwarded to the EDTEA

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Appendices

Appendix A: Layout Plan

Appendix B: Locality Plan

Appendix C: Environmental Authorisation (*still pending*)

Appendix D: Wetland Rehabilitation and Management Plan (WRMP), including an Alien Invasive Control and Management Plan (AIPCP)