SASOL SOUTH AFRICA LIMITED - SECUNDA OPERATIONS

RE-INSTATEMENT AND DEVELOPMENT OF THE VBC08 WETLAND

DRAFT BASIC ASSSESSMENT REPORT

08 SEPTEMBER 2021

DRAFT

RE-INSTATEMENT AND DEVELOPMENT OF THE VBC08 WETLAND

DRAFT BASIC ASSSESSMENT REPORT

SASOL SOUTH AFRICA LIMITED - SECUNDA OPERATIONS

TYPE OF DOCUMENT (VERSION)
DRAFT

PROJECT NO.: 41102282
DATE: SEPTEMBER 2021

WSP
BUILDING C, KNIGHTSBRIDGE
33 SLOANE STREET
BRYANSTON, 2191
SOUTH AFRICA

T: +27 11 361 1380
F: +086 606 7121
WSP.COM

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Draft BA Report for Public Review			
Date	September 2021			
Prepared by	Bathabile Mthembu			
Signature	-			
Checked by	Ashlea Strong			
Signature	 Digitally signed by Strong, Ashlea (ZAAS02685) DN: cn=Strong, Ashlea (ZAAS02685), ou=Active, email=Ashlea.Strong@wsp.com Date: 2021.09.07 12:33:36 +02'00'			
Authorised by	Ashlea Strong			
Signature	 Digitally signed by Strong, Ashlea (ZAAS02685) DN: cn=Strong, Ashlea (ZAAS02685), ou=Active, email=Ashlea.Strong@wsp.com Date: 2021.09.07 12:33:51 +02'00'			
Project number	41102282			
Report number	01			
File reference	file:///W:\000 NEW Projects\41102282 - Sasol Wetland Rehab BA + WUL\42 ES\2-REPORTS\01-BAR\			

SIGNATURES

PREPARED BY

-

Bathabile Mthembu,
Environmental Consultant

REVIEWED BY

Digitally signed by Strong, Ashlea (ZAAS02685)
DN: cn=Strong, Ashlea (ZAAS02685), ou=Active, email=Ashlea.Strong@wsp.com
Date: 2021.09.07 12:34:02 +02'00'

Ashlea Strong,
Principal Consultant

This Draft Basic Assessment Report (Report) for the Proposed Re-Instatement and Development of the VBC08 Wetland in Secunda, Mpumalanga Province has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of Sasol South Africa Limited - Secunda Operations (Client), as part of the application process for Environmental Authorisation.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

DOCUMENT DESCRIPTION

CLIENT

Sasol South Africa Limited - Secunda Operations

PROJECT NAME

Proposed Sasol Secunda Wetland Re-instatement Project, Mpumalanga, South Africa

REPORT TYPE

Draft Basic Assessment Report

WSP PROJECT NUMBER

41102282

PROJECT TEAM

CLIENT – SECUNDA OPERATIONS

Project Co-ordinator	Jaco Linde
Project Manager	Lasalle de Carvalho Jeronimo
SHE – Senior Specialist Environment	Valery Carelse
Civil engineer	Cara Smith
Safety Practitioner	Ferosa Linen

WSP

Principal Consultant	Ashlea Strong
Environmental Consultant	Bathabile Mthembu
Hydropedology Study	Thigesh Vather
Hydrology Study	Hassen Khan

SUBCONSULTANTS

Biodiversity and Wetland Study	Andrew Husted – The Biodiversity Company

ACRONYMS

ABBREVIATION	DESCRIPTION
BA	Basic Assessment
BODATSA	Based on the Plants of Southern Africa
CA	Commenting Authority
CBA	Critical Biodiversity Area
CR	Critical Ecosystem
CRR	Comment and Response Report
MDARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
DEA	Department of Environmental Affairs
DM	District Municipality
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Area
GA	General Authorisation
GNR	Government Notice Regulation
HPA	Highveld Priority Area
I&AP	Interested and Affected Party
ICMA	Integrated Coastal Management Act (2008)
IUCN	International Union for Conservation of Nature
LM	Local Municipality
MBSP	Mpumalanga Biodiversity Sector Plan
MSDS	Material Safety Data Sheet
MPTA	Mpumalanga Tourism and Parks Agency
NCCAS	National Climate Change Adaptation Strategy
NEMA	National Environmental Management Act (1998)
NEMBA	National Environmental Management: Biodiversity Act (2004)

ABBREVIATION	DESCRIPTION
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resource Act (1999)
NT	Not Threatened
PES	Present Ecological State
PPE	Personal Protective Equipment
RESM	Receiving Environment Surface Monitoring
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SIC	Secunda Industrial Complex
SMS	Short Message Service
SO	Secunda Operations
SWA	Strategic Water Source Areas
VBC	Valley Bottom Channelled Wetland System
VU	Vulnerable
WMA	Water Management Area
WSP	WSP Group Africa (Pty) Ltd
WUL	Water Use License

CONTENT OF THIS REPORT

As per the Environmental Impact Assessment (EIA) Regulations 2014, as amended in 2017, Appendix 1 of Government Notice Regulation (GNR) 326 identifies the legislated requirements, which must be contained within a Basic Assessment (BA) Report for the competent authority to consider and come to a decision on the application**.** Error! Reference source not found. below details where the required information is located within this BA Report.

Table A1: Legal Requirements as detailed in Appendix 1 of GNR 326

APPENDIX 1 of GNR 326	**DESCRIPTION**	**RELEVANT REPORT SECTION**
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	Section **Error! Reference source not found.** and **Appendix A**
3(1) (b)	The location of the activity, including: — the 21-digit Surveyor General code of each cadastral land parcel; — where available, the physical address and farm name; — where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	**Section 2.1**
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale, or, if it is: — a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or — on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	**Figure 1, Figure 2 and Figure 3**
3(1) (d)	A description of the scope of the proposed activity, including: — all listed and specified activities triggered and being applied for; and — a description of the activities to be undertaken including associated structures and infrastructure	Section 3.1.5 Section 2
3(1) (e)	A description of the policy and legislative context within which the development is proposed, including: — an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and — how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 3
3(1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location	Section 2.3
3(1) (g)	A motivation for the preferred site, activity and technology alternative	Section 2.4
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site, including: — details of all the alternatives considered; — details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 2.4 Section 4 Section 5 Appendix E

APPENDIX 1 of GNR 326	DESCRIPTION	RELEVANT REPORT SECTION
	— a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; — the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; — the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— — can be reversed; — may cause irreplaceable loss of resources; and — can be avoided, managed or mitigated; — the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; — positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; — the possible mitigation measures that could be applied and level of residual risk; — the outcome of the site selection matrix; — if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and — a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 6 Section 7 Section 8
3(1) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including; — a description of all environmental issues and risks that were identified during the environmental impact assessment process; and — an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 4.4 Section 7 Section 8
3(1) (j)	An assessment of each identified potentially significant impact and risk, including— — cumulative impacts; — the nature, significance and consequences of the impact and risk; — the extent and duration of the impact and risk; — the probability of the impact and risk occurring; — the degree to which the impact and risk can be reversed; — the degree to which the impact and risk may cause irreplaceable loss of resources; and — the degree to which the impact and risk can be avoided, managed or mitigated	Section 7 8
3(1) (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the Final Report	Section 7 Appendix F
3(1) (l)	An environmental impact statement which contains: — a summary of the key findings of the environmental impact assessment;	Section 8

APPENDIX 1 of GNR 326	DESCRIPTION	RELEVANT REPORT SECTION
	— a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and — a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
3(1) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	**Appendix F**
3(1) (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 8
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section **Error! Reference source not found.**
3(1) (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 8
3(1) (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be conducted, and the post construction monitoring requirements finalised	N/A
3(1) (r)	An undertaking under oath or affirmation by the EAP in relation to: — the correctness of the information provided in the reports; — the inclusion of comments and inputs from stakeholders and I&APs; — the inclusion of inputs and recommendations from the specialist reports where relevant; and — any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	**Appendix B**
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
3(1) (t)	Any specific information that may be required by the competent authority	Pre-application requests from MDARDLEA: (a) During the pre-application with MDARDLEA, WSP was requested to ensure that the MTPA is consulted with regards to the sensitive areas.
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	N/A

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1 BACKGROUND TERMS OF REFERENCE

Secunda Operations (SO), a division of Sasol South Africa Limited (Sasol) intends to submit an application for Environmental Authorisation (EA) to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA) for the proposed reinstatement of a Channelled Valley Bottom Wetland (VBC08) located below the Nitro Fertiliser plant.

Sasol aim to improve the functionality of the VBC08 wetland system by developing an instream constructed/artificial wetland (passive system) that could augment the existing natural wetland system. The purpose will be to reduce nutrient and salt load into the Groot Bossiespruit.

1.2 PURPOSE OF BASIC ASSESSMENT PROCESS

The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process aims to identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of potential negative and positive consequences of the proposed wetland reinstatement project. This provides the competent authority (MDARDLEA) sufficient information to make an informed decision concerning the granting or refusing the EA applied for.

1.3 DETAILS OF THE KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

Sasol is the project proponent (Applicant) applying for the construction and operation of the wetland intervention infrastructure. Details of the project proponent are provided in **Table 1-1.**

Table 1-1: Details of project proponent

PROPONENT	**SASOL SOUTH AFRICA LIMITED - SECUNDA OPERATION (SO)**
Contact Person:	Wilma Groenewald
Physical Address:	PDP Kruger Drive Secunda 2302
Telephone:	+27 17 610 5105
Cell:	+27 71 680 4315
Email:	wilma.groenewald@sasol.com

1.3.2 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP is one of the world's leading professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. We design lasting solutions in the Transportation &

Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as offering strategic advisory services. With approximately 49,500 talented people globally, we engineer projects that will help societies grow for lifetimes to come.

In Africa, WSP, Environment and Energy, is a leading environmental consultancy with a broad range of expertise and over 23 years' experience in the regional market. As part of a global business, we provide the marketplace with a dynamic blend of local knowledge and global expertise.

We offer independent, insightful and professional advice to our clients to achieve a balance between environmental protection, social desirability and economic development.

We have a reputation for delivery and excellence and provide a diverse range of integrated and innovative solutions to both public and private sector clients across the industrial, mining, infrastructure and financial sectors.

WSP has been appointed by Sasol to fulfil the role of independent Environmental Assessment Practitioner (EAP) to undertake the BA process in terms of the National Environmental Management Act, (No. 107 of 1998) (NEMA) and the EIA Regulations, 2014, as amended.

As required by NEMA, the qualifications and experience of the key independent EAPs undertaking the EIA are detailed in and the relevant Curriculum Vitae are provided in **Appendix A**, with the EAP's Declaration of Interest attached as **Appendix B.** In order to adequately identify and assess potential impacts, independent and qualified specialists in respective fields of study supported the EAP. The details of the EAP are outlined in **Table 1-2**.

Table 1-2: Details of EAP

EAP	**WSP GROUP AFRICA (PTY) LTD**
Contact Person:	Ashlea Strong
Physical Address	Building C, Knightsbridge 33 Sloane Street Bryanston 2191
Postal Address:	P O Box 98867, Sloane Park, 2152
Telephone:	011 361 1392
E-mail:	Ashlea.strong@wsp.com
Qualifications	– Masters in Environmental Management, University of the Free State, South Africa, 2006 – B Tech, Nature Conservation, Technikon SA, South Africa, 2001 – National Diploma in Nature Conservation, Technikon SA, South Africa, 1999
Professional Registration	Registered Environmental Assessment Practitioner (Registration Number: 2019/1005)

Expertise to conduct this BA	Mrs A Strong is a Principal Consultant with 17 years' experience in the environmental field. She currently provides technical and strategic expertise on a diverse range projects in the environmental management field, including environmental scoping and impact assessment studies, environmental management plans, waste and water management, as well as the provision of environmental management solutions and mitigation measures Ashlea has been involved in the management of a number of large EIAs specifically within the energy sector such as the Medupi Power Station, and Pebble-Bed Modular Reactor (PBMR) and numerous Transmission Powerlines. She also has significant environmental auditing experience and expertise. Ashlea holds a Masters in Environmental Management; a BTech (Nature Conservation), and a National Diploma (Nature Conservation). She is also a Registered Environmental Assessment Practitioner.

1.3.3 SPECIALISTS

Specialist input was required in support of this application for EA. The details of the specialists are provided in **Table 1-3.** The Curriculum Vitae of the specialists are attached in **Appendix A.** The signed specialist declarations are included as **Appendix C**.

Table 1-3: Details of Specialist

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT
Biodiversity and Wetland Assessment	Andrew Husted, and Martinus Erasmus	The Biodiversity Company	**Appendix D1**
Hydrological Assessment	Hassen Khan	WSP	**Appendix D2**
Hydropedological Assessment	Thigesh Vather	WSP	**Appendix D3**

1.3.4 COMPETENT AUTHORITY

The competent authority for the proposed project has been confirmed to be the MDARDLEA. Details of the competent authority are provided in **Table 1-4.**

Table 1-4: Competent Authority

Authority	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA).
Contact Person	Sindisiwe Mbuyane
Telephone:	017 811-3951
Email:	MbuyaneSB@mpg.gov.za

1.3.5 COMMENTING AUTHORITIES

The following commenting authorities have been identified for this application:

- Department of Water and Sanitation (DWS) - will act as a commenting authority for this application and will provide input about water use license permitting;

- The site falls within the Vaal Water Management Area (WMA) authority and will therefore be provided with an opportunity to provide comment on the BA Report;
- South African Heritage Resource Agency (SAHRA);
- Mpumalanga Heritage Resources Authority;
- Mpumalanga Tourism and Parks Agency (MTPA);
- Gert Sibande District Municipality; and
- Govan Mbeki Local Municipality.

1.4 BASIC ASSESSMENT REPORT STRUCTURE

The structure of this Draft BA Report is presented in **Table 1-5.**

Table 1-5: Structure of this Report

SECTION	CONTENTS
Section 1 – Introduction	Provides a brief background to the proposed project and outlines the purpose of this document, as well as identifying the key role players, content of the report and the assumptions and limitation applicable to the assessment.
Section 2 – Project Details	Describes the project location and surrounding area, project history, and a project description. This section also provides a summary description of the proposed Project Alternatives.
Section 3 – Legal Framework	Provides a brief summary and interpretation of the relevant legislation in terms of the proposed project.
Section 4 – Scope of Work and Methodology	Provides a description of the BA process being undertaken and the methodology employed.
Section 5 - Stakeholder Engagement	Provides a description of the Stakeholder Engagement Process undertaken during the course of the BA process.
Section 6 – Baseline Environment	Describes the biophysical and socio-economic characteristics of the affected environment against which potential project impacts are assessed.
Section 7 – Environmental Impact Assessment	Describes the specialist studies undertaken and assesses the potential impacts of the project as well as project alternatives. The significance of the impacts and proposed mitigation measures are presented.
Section 8 – Environmental Impact Statement	Provides the Environmental Impacts Statement including principle findings as well as recommendations and the authorisation opinion.

1.5 ASSUMPTIONS AND LIMITATIONS

As is standard practice, the report is based on a number of assumptions and is subject to certain limitations. The following assumptions and limitations have been made/ identified during the assessment process and during the compilation of this BA Report:

- The EAP hereby confirms that they have undertaken to obtain project information from the Client that is deemed to be accurate and representative of the project;
- Where detailed design information is not available, the precautionary principle (i.e. a conservative approach that overstates negative impacts and understates benefits) has been adopted;

- The comments received in response to the public participation process, are representative of comments from the broader community; and
- The competent authority would not require additional specialist input, as per the proposals made in this report, in order to make a decision regarding the application;
- This report is assessing the impact of the proposed wetland reinstatement and associated activities only; and
- The findings, results, observations, conclusions and recommendations given in this report are based on WSP's best scientific and professional knowledge as well as available information.

Notwithstanding these assumptions, it is the view of WSP that this BA Report provides a sound description of the issues associated with the project and the resultant impacts, and that the MDARDLEA would be able to make a decision using this information.

2 PROJECT DETAILS

This section provides a description of the location of the project area and the site location alternatives considered for the project. The descriptions encompass the activities to be undertaken during the construction and operational phases as well as the consideration for site accessibility, water demand, supply, storage, electricity demand and supply, site waste management and the needs and desirability of the project in accordance with Appendix 1 of GNR 326.

2.1 LOCATION OF THE PROPOSED PROJECT

The Secunda Industrial Complex (SIC) is located in Secunda, approximately 50 km north of Standerton and 28 km west of Bethal in the Mpumalanga Province (**Figure 2-1).** The site is located within the Gert Sibande and Govan Mbeki District and Local Municipality respectively.

The VBC08 wetland system is located within the C12D catchment and forms part of the Groot Bossiespruit, which leads into the Waterval River and eventually into the Vaal River. The VBC08 wetland system is located (**Table 2-1**) within the SIC directly south of the Nitro Fertiliser Plant.

Table 2-1: Cadastral Information of the Site

SITE LOCATION DETAILS SS PER GN.R326 ANNEX 1 (3)	
21 digit Surveyor General code of each cadastral land parcel:	T0IS00000000029100000 T0IS00000000029100004 T0IS00000000028500003 T0IS00000000028500005 T0IS00000000028500006
Landowner:	Sasol South Africa Limited including the following divisions: – Sasol Chemiese Nywerhede Limited – Sasol Mining Pty Ltd
Physical address and farm name:	PDP Kruger Drive Secunda 2302 Mpumalanga Province
Land use Zoning:	Open Space and Industrial use

The coordinates of the proposed VBC08 wetland system are outlined in location are outlined in **Table 2-2** and illustrated in **Figure 2-2**.

Table 2-2: Co-ordinates of the VBC08 Wetland System

Points	**Latitude**	**Longitude**
Start	26º 36’ 3.64“S	29º 11‘ 42.75“ E
Middle	26º 35‘ 24.76“S	29º 10‘ 23.39“ E
End	26º 34‘ 3.89“ S	29º 9‘ 25.20“ E

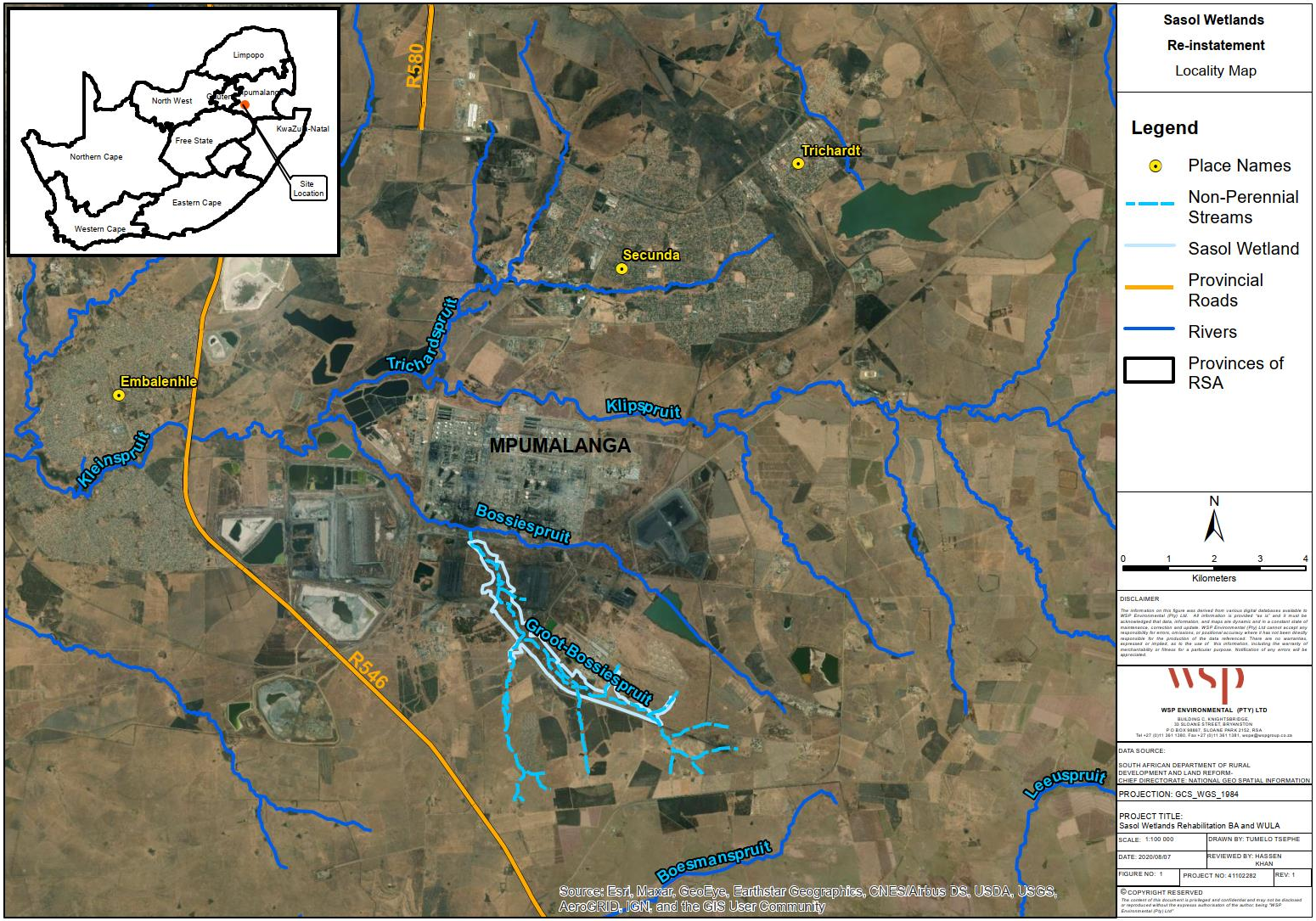
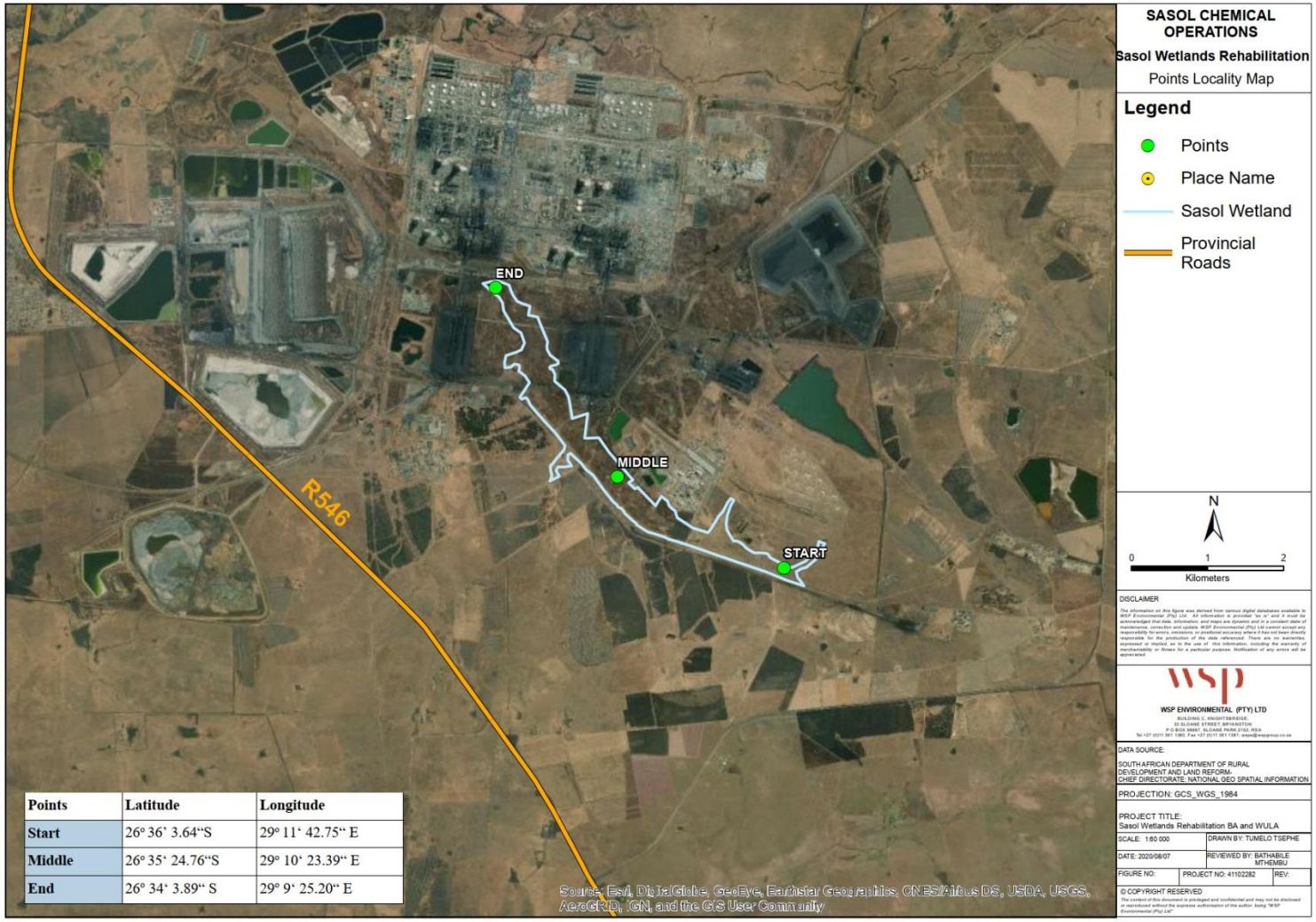


Figure 2-1: Location of the Proposed Wetland Reinstatement Project (WSP GIS, 2021)



Points	Latitude	Longitude
Start	26° 36' 3.64"S	29° 11' 42.75" E
Middle	26° 35' 24.76"S	29° 10' 23.39" E
End	26° 34' 3.89" S	29° 9' 25.20" E

Figure 2-2: Co-ordinates of the VBC08 Wetland System (WSP GIS, 2021)

2.2 PROJECT DESCRIPTION

Sasol are proposing the reinstatement of a Channelled Valley Bottom Wetland (VBC08) located directly south of the Nitro Fertiliser plant. The reinstatement project entails the installation of up to eighteen wetland intervention structures (weirs) at various points along the VBC08 wetland system. The location and co-ordinates of the 18 structures are outlined and illustrated in **Table 2-3** and **Figure 2-3** respectively**.** The installation of the weirs will help improve the wetland health by reducing nutrient and salt load into the Groot Bossiespruit.

Table 2-3: Co-ordinates of the 18 Wetland Intervention Structures

Structure	Latitude	Longitude
Wetland interventions		
1	26°36'4.89"S	29°11'40.01"E
2	26°36'2.11"S	29°11'34.86"E
3	26°35'56.77"S	29°11'20.73"E
4	26°35'53.83"S	29°11'9.87"E
5	26°35'53.13"S	29°11'0.02"E
6	26°35'46.48"S	29°10'49.02"E
7	26°35'31.57"S	29°10'28.31"E
8	26°35'25.80"S	29°10'22.20"E
9	26°35'10.29"S	29°10'2.47"E
10	26°35'6.18"S	29° 9'59.56"E
11	26°34'51.56"S	29° 9'52.33"E
12	26°34'38.12"S	29° 9'42.41"E
13	26°34'19.02"S	29° 9'42.95"E
Optional Intervention Structures		
14	26°35'42.18"S	29°10'39.21"E
15	26°34'27.96"S	29° 9'43.98"E
16	26°34'16.21"S	29° 9'38.71"E
17	26°34'10.98"S	29° 9'32.78"E
18	26°34'3.89"S	29° 9'25.20"E

Figure 2-3: Proposed Wetland Interventions (WSP GIS, 2021)

2.2.1 DESIGN AND PLANNING PHASE

Conceptual rehabilitation measures were planned by undertaking numerous site visits, wetland specialist consultation and modelling of the VBC08 wetland system. To ensure an accurate prediction of the functioning aspects of an envisaged system, site-specific data and a number of numerical models were integrated. The planning phase of proposed VBC08 wetland reinstatement included the conceptual design and placement of up to 18 weirs in the wetland system. The conceptualised placement of each structure was determined using the PCSWMM backwater model.

2.2.2 CONSTRUCTION ACTIVITIES

The proposed VBC08 wetland reinstatement project is expected to be completed within a period of 3 to 6 months. The construction phase entails the installation of up to 18 weirs and other activities outlined below:

- Water within wetland system will have to be diverted to create appropriate conditions for construction;
- General earthworks to reshape uneven ground to allow for a more natural slope on the topography;
- Impeding and diverting the flow of water within a watercourse; and
- The removal of alien invasive species and establishment of vegetation

Each structure must be strategically placed so that the freestanding water under a 1:100 year flood does not back flood the previous structure.

2.2.3 OPERATIONAL ACTIVITIES

There are no major services required for the operation of the weirs except for maintenance activities. Ongoing monitoring and maintenance will be undertaken in line with the EMPr.

2.2.4 DECOMMISSIONING ACTIVITIES

The infrastructure will be decommissioned once it is no longer deemed viable. The decommissioning of infrastructure may be subject to an environmental process in terms of NEMA (dependent on regulations requirements) and an environmental authorisation would be applied for prior to commencement.

2.2.5 WASTE MANAGEMENT

Waste will be generated during the construction phase where the bulk of waste will be from contractors on the site during construction. General waste (domestic waste etc.) and potentially small amounts of hazardous waste (oils, fuel and cement etc.) will be generated during construction. During operation, contractors are only on the site for limited period of time as and when maintenance is required, which will result in very low waste volumes. Waste Management at the project site will be undertaken in line with the EMPr to consider the correct disposal of general and hazardous waste generated on the project.

2.3 NEED AND DESIRABILITY OF THE PROJECT

In April 2019, Sasol commissioned Wet-Earth Eco-Specs to conduct a re-assessment of the wetlands within the SIC. The re-assessment included previously assessed wetlands, and also any new wetland areas found.

The wetland system considered for the re-instatement and development of the VBC08 wetland system project, was identified, delineated and assessed by Wet-Earth Eco-Specs (2019). The Wet-Earth Eco-Specs (2019) reference for the system was D1VBC and **Table 2-4** presents the general information sourced from the Wet-Earth Eco-Specs (2019) Report. The following information pertaining to the ecological significance of the system is summarised from the re-assessment report:

- The hydrology of the system was determined to be critically modified (class F), with the geomorphology and vegetation status of the system determined to be seriously modified (class E), with an overall ecological status classified as class E;
- An intermediate level (score 1.56) of ecosystem services are provided by the system; and
- No Ecological Importance and Sensitivity (EIS) assessment was completed for the re-assessment.

Table 2-4: Wetland D1VBC General Wetland Information (Wet-Earth Eco-Specs, 2019)

ASPECT	DESCRIPTION
Classification	Valley bottom wetland with no channel
Wetland size	173ha
Size Relative to Catchment	7%
Catchment size (estimate)	2451ha
Wetland slope	1.2%
Soil	The wetland soils are mainly of the Rensburg and Arcadia soil forms. In the south-eastern section of the wetland, the G-horizons, situated at depths between 15 and 50 cm, are rich in carbonate mineral. (Wet Earth, 2017).
Vegetation	The vegetation is dominated by: *Phragmites australis, Typha capensis, Schoenoplectus brachyceras, Leersia hexandra, Persicaria officinalis, Juncus lomatifolius*, etc. Vast areas are dominated by exotic species such as: *Verbena bonariensis, Bidens pilosa, Pennisetum clandestinum, Cosmos bipinnatus, Conyza sumatrensis*
Impacts	– Grazing and trampling, – Exotic vegetation (mainly pioneers), – Road crossings and conveyor belt crossings, which impound and concentrate flow in the wetland and the causeway in the upper reaches, which have severely compromised the hydrological functioning of the wetland (Golder, 2016), – A powerline and servitude crossing, – A series of small dams, – The Groot-Bossiespruit could be impacted by a coal conveyor (from Twistdraai East Mine), coal stockyard, coal beneficiation area, and the coal discard dump, – Seepage from fertiliser dams 2,3,4,5,6, 8a and 8b, as well as stormwater/surface run-off from the SNF plant, – Excessive growth of Phragmites australis due to the enrichment of water, and – Severe eutrophication was noted in the section of the wetland below and to the east of the Sasol Nitro Plant and Fertiliser Dams Complex, etc.

Wet-Earth Eco-Specs (May, 2020) was commissioned to compile a wetland management plan for wetland watercourses within the SIC, which included the D1VBC system. For the purposes of the plan, the valley bottom wetland was divided into two habitat areas and referred to as D1(a)VBC and D1(b)VBC (**Figure 2-4**). The following is summarised from the Wet-Earth Eco-Specs (2020) Report:

- The Present Ecological State (PES) of D1(a)VBC and D1(b)VBC was determined to be seriously modified (class E) and moderately modified (class C) respectively; and
- The EIS of D1(a)VBC and D1(b)VBC was determined to be moderate (class C) and high (class B) respectively.

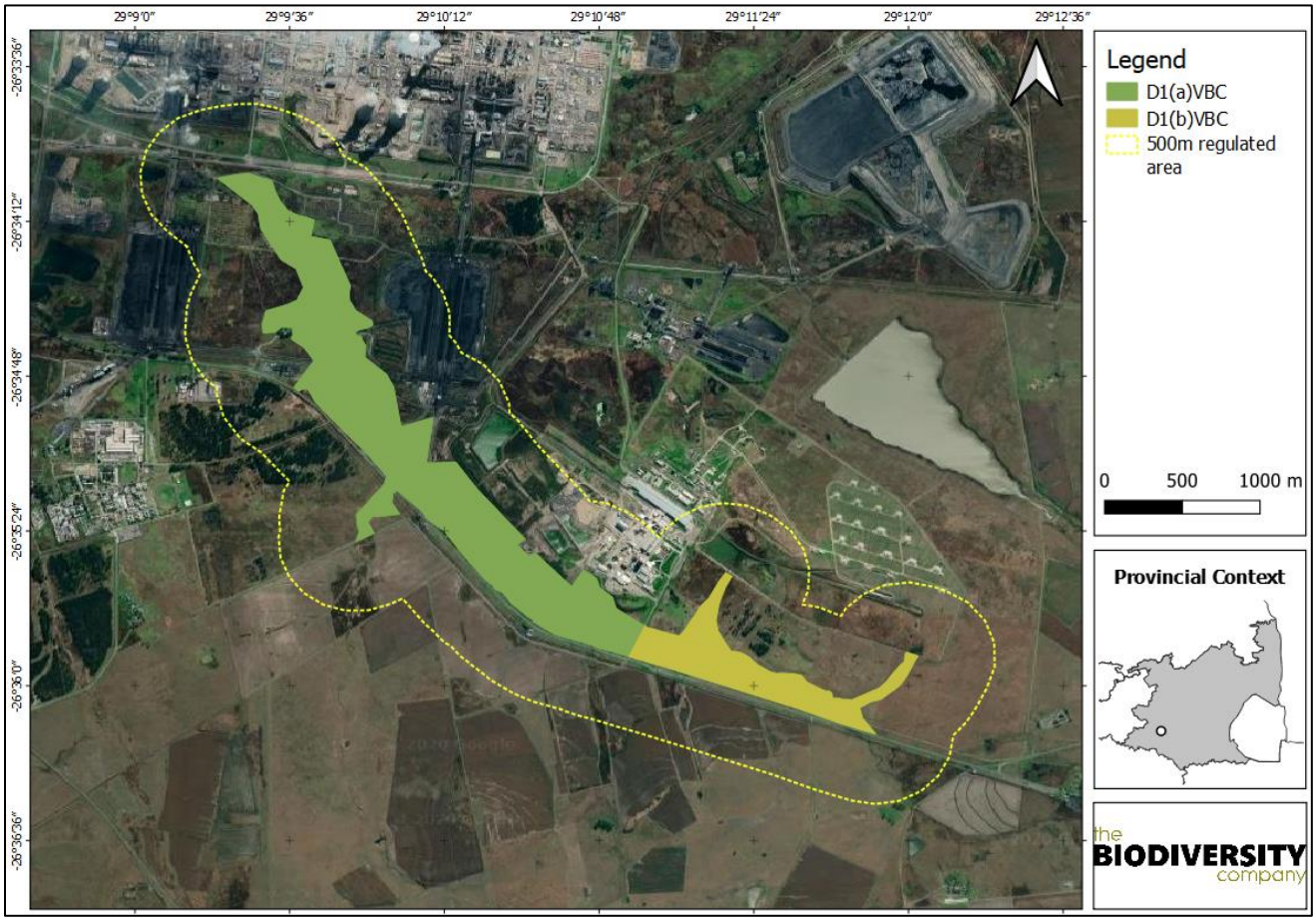


Figure 2-4: The general extent of D1 (a) VBC and D1 (b) VBC considered for the project

The purpose and aim of the wetland reinstatement project can be summarised as follows:

- Rehabilitation of damage to the hydrological integrity of the wetland attributable to impeding structures, through placement of engineered interventions at identified problem locations (e.g. conveyor and road crossings), to slow and spread the flow of water and re-wet the system;
- Rehabilitation of the vegetation aspect of the wetland's health – although re-wetting of the system will ultimately result in the return of wetland vegetation to VBC08 in lieu of the current terrestrial pioneer vegetation composition; and
- Address the input of nutrients and salts to the wetland from surface water runoff from the adjacent Sasol Nitro Plant through more appropriate stormwater management planning, and the rehabilitation of the current wetland system.

Furthermore, the additional benefits of the reinstatement project include:

- The rehabilitation of the wetland will prohibit the wetland from further scouring and deteriorating to a possible health category F;
- The reduction of contaminants including inorganic matter, organic matter, toxic compounds and metals being discharged into the nearby rivers.
- The attenuation of any incidental spills from the Nitro Fertiliser Plant and this would be not be directly released into the Groot Bossiespruit. The spill intensity would also be diluted by the water accumulated in the wetland system, minimising downstream water and biodiversity impacts.
- The improved functionality of the system will minimise salt loads and reduce nitrate concentrations.

2.4 PROJECT ALTERNATIVES

In terms of the EIA Regulations, feasible alternatives are required to be considered within this Draft BA Report. All identified, feasible alternatives are required to be evaluated in terms of social, biophysical, economic and technical factors. However, since this section discusses the alternatives and provides key reasons (motivation) for elimination upfront as they will not be feasible, only the preferred option will be assessed in the impact assessment section.

A key challenge of the BA process is the consideration of alternatives. Most guidelines use terms such as 'reasonable', 'practicable', 'feasible' or 'viable' to define the range of alternatives that should be considered.

Essentially, there are two types of alternatives:

- Incrementally different (modifications) alternatives to the project; and
- Fundamentally (totally) different alternatives to the project.

Fundamentally, different alternatives are usually assessed at a strategic level, and EIA practitioners recognise the limitations of project-specific BAs to address fundamentally different alternatives. Project level alternatives such as site selection and technology alternatives have been addressed below.

2.4.1 OPTION 1: BIOREACTOR

Direct intervention using a bioreactor **(Figure 2-5)** is one option for the chemical treatment of nitrate and phosphate within the VBC08 wetland system. Activated sludge will be used as a treatment method for removing nitrogen and phosphorus from the wastewater.

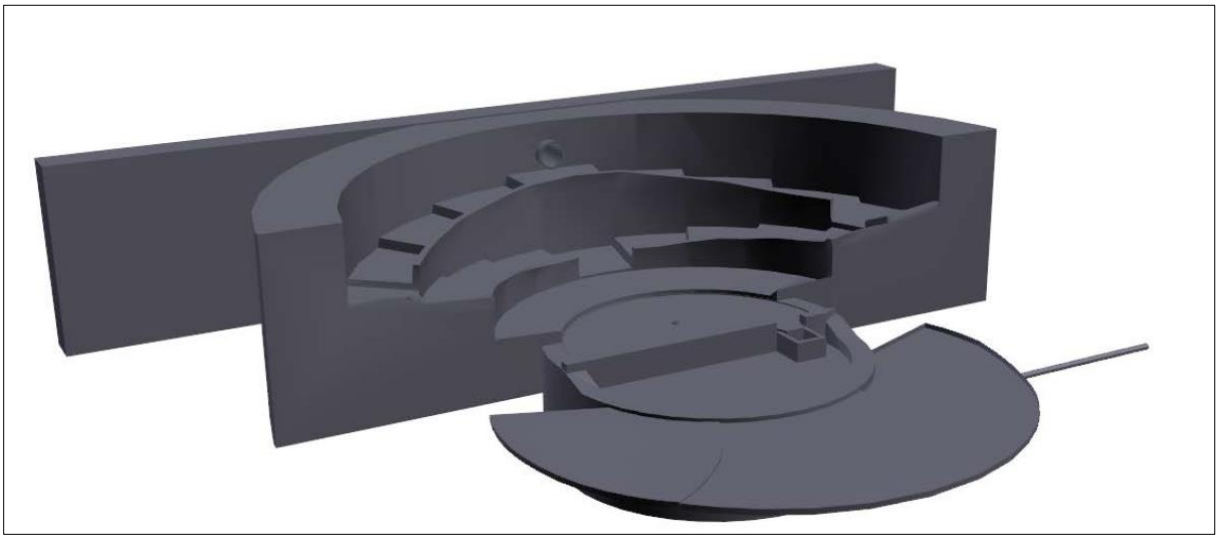


Figure 2-5: Proposed Bioreactor Structure (Golder Associates, 2019)

During the bioreactor modelling it was found that the bioreactor could reduce the levels of phosphate and nitrate in the system, however the bioreactor has a couple of limiting factors, such as amount of water treatable for the size of the bioreactor. Since the bioreactor was proposed to be constructed in the wetland there is limited space available to construct the bioreactor and thus the size limitations only allowed for a 50m^3/day bioreactor.

During medium to high flow events the flows in wetland VBC08 are well above the 50 m^3/day and thus will just spill around and bypass the structure. Therefore, it was found that the bioreactors treatment ability becomes insignificant in the treatment of nitrate and phosphate and does not warrant the possible capital expenditure.

As the bioreactors where insignificant in the treatment of the constituents in comparison to the nitrate and phosphate concentration moving into the wetlands, the bioreactors are not considered a viable alternative.

2.4.2 OPTION 2: CHEMICAL TREATMENT

The chemical treatment can be done by dosing various chemicals to the water to remove the nutrients. Various cationic metals such as Iron or Calcium could be used to eliminate phosphorus out of the system as iron phosphate or calcium phosphate. However, these metals are usually dosed as acid-base pairs such as iron sulphate or calcium hydroxide, where the resulting anionic pairs (e.g. sulphate and hydroxide) may have further undesired influences on water chemistry. A method of removing the resultant precipitate would also have to be addressed; otherwise, the precipitate may settle in the reactor and cause siltation on the wetland floor over time. A challenge with chemical treatment is that dosing requires accuracy. An overdose of the chemicals will result in water rich in additional contaminants affecting water quality and the ecosystem further. Chemical treatment is therefore not considered a viable alternative.

2.4.3 OPTION 3: PHYSICAL TREATMENT

Physical treatment techniques such as reverse osmosis or packed column adsorption (stripping) could be used to remove dissolved nitrogen and phosphorus; however these options present further difficulties. Given the high concentration of minerals already present in the water, in particular calcium, the filtration media or adsorption media in the above will likely have a very high fouling or scaling rate that will result in significant operation and maintenance implications. Furthermore, these techniques require advance machinery and control equipment that will not be suited to a wetland environment. Physical treatment is therefore not considered a viable alternative.

2.4.4 OPTION 4 (PREFERRED): WEIRS

Another direct intervention option is the use of weirs (**Figure 2-6)** without the bioreactor.

The weir's main function is to raise the water table, yet allow sufficient water to move through the weir and ensure that the water source is not cut off. The structure will also slow down water velocities in the system thus reducing the potential for valley bottom erosion.

The use of weirs as wetland intervention structures has been identified as the preferred alternative for the reinstatement of the VCB08 wetland system.

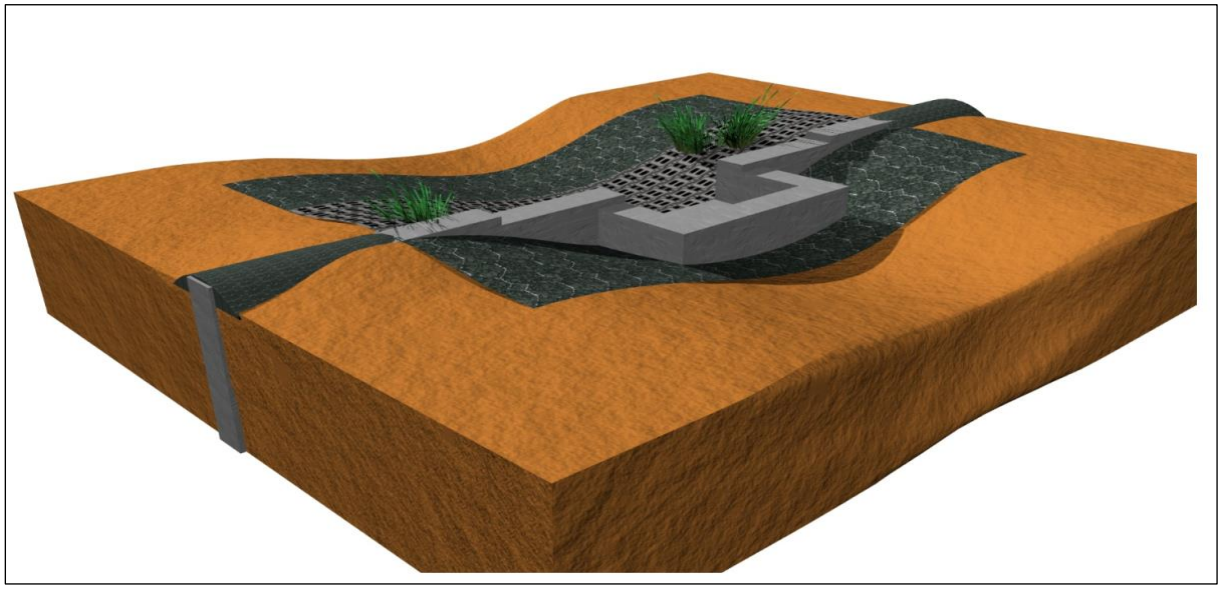


Figure 2-6: Proposed Box Weir Structure (Golder Associates, 2019)

To augment the use of the weirs, the following indirect rehabilitation measures will also be required to increase the efficiency of the reinstatement of the VBC08 wetland system. **Table 2-5** indicates typical indirect rehabilitation measures.

Table 2-5: Indirect Rehabilitation Measures

REHABILATION MEASURE	PURPOSE OF IMPROVEMENT/INTERVENTION	DECSRIPTION OF IMPROVEMENT/INTERVENTION
Dam wall removal only at dams above fertiliser plant	To allow a more regular/consistent flow through the wetland system	Breach dam wall and stockpile material for mixing with sediment. Mix sediment in a ratio of 1 to 5. Re-establish the natural vegetation.
Earthworks	General earthworks are used to reshape uneven ground this allows a more natural slope on the topography	Routine shaping and levelling
Alien vegetation removal	To reinstate natural bio-diversity and functional vegetation communities	The current vegetation community of VBC08 is dominated by dense stands of weed species (Figure 29), some of which are considered invasive. The removal of these weed species is strongly recommended. It is understood that a burn regime cannot be introduced due to significant health and safety concerns. Instead, the weeds can be achieved via manual removal, or ideally could be addressed through very low-density grazing i.e. one or two cattle on a seasonal basis (in spring) to prevent new weed growth taking place and assist in breaking down old dense stands of weed material, thereby providing opportunity for wetland plant species to take hold.
Re-establishment of vegetation	To reinstate natural bio-diversity and functional vegetation communities	Conduct hydro-seeding with appropriate seeds mix over the Armorflex portions. Seed bed harvesting to be used in areas of shaping and levelling as well as in area where alien vegetation is removed.

Indirect measures such as removal of invasive alien plant species, restoration of incised channels and re-wetting of desiccated areas, will enhance the wetland health and plant diversity within VCB08. Hence, contribute to the maintenance of biodiversity and ecosystem service delivery. These improvements will increase the ecological importance and sensitivity (EIS) to a level where the wetland could potentially contribute to increased wetland biodiversity value through support of a greater diversity of species, particularly charismatic mammals, amphibians and waterfowl.

The predicted improvement in the PES score would represent an increase in functional value to 60-80%, from 20-40%, that is, the capacity of the VBC08 wetland to supply ecosystem services would be increased. The predicted increase in supply of ecosystem services such as streamflow regulation, removal of phosphate and nitrate, provision of habitat for wetland plants and animals, and maintaining base flow downstream during dry periods,

2.5 NO-GO ALTERNATIVE

The no-go option will mean the status quo remains and the wetland ecological status being a Present Ecological (PES) score of Class E. The predicted improvement in the PES Status score would not increase in functional value of 60-80%, but would remain at 20-40%. Therefore, the capacity of the VBC08 wetland to supply ecosystem services would also decrease. The no-go alternative will reduce ecosystem services such as streamflow regulation, removal of phosphate and nitrate and provision of habitat for wetland plants and animals. The no-go alternative is not preferred, as it would prevent Sasol from environmental enhancement of the overall wetland system and services.

3 LEGAL FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at national and regional levels carry out environmental protection functions. The following sections outline summaries of:

- Key regulatory authorities and other relevant bodies related to the governance of the proposed activities, the BA process, and other permitting requirements.
- Current national, provincial and local legislative framework in South Africa as it relates to the project during planning, development and operation; including national policies and standards referred to as guidelines for the identification and management (including mitigation) of impacts.
- This section lists the key pieces of legislation to the BA process, but this list should not be considered exhaustive.

3.1 NATIONAL LEGAL AND REGULATORY FRAMEWORK

3.1.1 WHITE PAPER ON ENVIRONMENTAL MANAGEMENT POLICY NATIONAL (1997)

The White Paper on Environmental Management's objective is to promote conservation of biodiversity, ecosystems, habitats and biological communities. This can be achieved through creating and implementing environments and incentives that support the conservation and sustainable use of biodiversity. The proposed VBC08 wetland reinstatement project is highly aligned with the white policy because it will improve wetland functionality. Therefore, improve the quality and reliability of watercourse required to maintain ecological functions and promoting long-term sustainability of biodiversity and associated ecosystems.

3.1.2 NATIONAL CLIMATE CHANGE ADAPTATION STRATEGY (2017)

The National Climate Change Adaptation Strategy (NCCAS) has been developed in line with South Africa's commitment to the Paris Agreement on Climate Change to introduce measures to adapt to the effects of climate change while achieving the stabilisation of greenhouse gas emissions and limiting temperature increases to 1.5 °C. The NCCAS provides a common vision of climate change adaptation and climate resilience for the country, and outlines priority areas for achieving this vision. National strategic processes are critical to successful climate change adaptation planning and implementation. Adaptation strategies, sometimes referred to as frameworks at national scale, position countries to reduce their climate change risks and take advantage of economic opportunities.

Wetlands are carbon-sequestering systems hence can store excess carbon form the atmosphere which is a contributor to climate change. The restoration and rehabilitation of wetlands will enhance the health of the VBC08 wetland system and improve the ecosystems ability to adapt to climate change impacts.

3.1.3 THE CONSTITUTION OF SOUTH AFRICA (NO 108 OF 1998)

Since 1994 South African legislation, including environmental legislation has undergone a large transformation and various laws and policies were promulgated with a strong emphasis on environmental concerns and the need for sustainable development. The Constitution of South Africa (No. 108 of 1996) (The Constitution) provides environmental rights (contained in the Bill of Rights, Chapter 2, Section 24) and includes implications for environmental management. The environmental rights are guaranteed in Section 24 of the Constitution, and state that:

"Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*

- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
- *Prevent pollution and ecological degradation;*
- *Promote conservation and*
- *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."*

The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights. In terms of the Constitution, the applicant has an obligation to ensure that the proposed development is sustainable.

3.1.4 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998) (AS AMENDED)

The NEMA, as amended, provides the environmental legislative framework for South Africa and established the principles for decision-making on matters affecting the biophysical and social environmental. The Act requires that specific development activities be investigated as it may have a potential impact on the environment, socio-economic conditions, and cultural heritage. The results of such investigation must be reported to the relevant authority for decision-making. Such activities may only proceed once authorised by the decision-making authority. Procedures for the investigation and communication of the potential impact of activities are contained in Section 24(7) of the Act. This BA process will be undertaken in line with Section 2 of NEMA

3.1.5 NEMA EIA REGULATIONS 2014, AS AMENDED

On 4 December 2014, the Minister responsible for Environmental Affairs promulgated the EIA Regulations (GNR 982) in terms of Chapter 5 of the NEMA. The EIA Regulations was subsequently amended in 2017 (GN 326). The EIA Regulations 2014, as amended, contain three listing notices (GNR 327, 325 and 324) which identify activities that are subject to either a Basic Assessment or Scoping and EIA in order to apply for an Environmental Authorisation (EA). A BA must be completed if the proposed project triggers activities listed in GNR 327 (Listing Notice 1) and/ or GNR 324 (Listing Notice 3). If an activity triggers any activity listed within GNR 325 then S&EIA process must be completed.

WSP undertook a review of the listed activities according to the proposed project description to conclude that Listed Activities from GNR 327 and GNR 324 are considered applicable **(Table 3-1)** to the proposed development and therefore a BA process must be followed.

Table 3-1: Determination of Potential Listed Activities

ACTIVITY	DESCRIPTION	APPLICABILITY TO PROJECT
GNR. 327 Listing Notice 1		
Activity 12	The development of:– dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 100 square metres; or infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs - within a watercourse;	The VBC08 wetland reinstatement will include installation of up to 18 weir structures along the wetland, with the footprint of more than 100 square metres.

ACTIVITY	DESCRIPTION	APPLICABILITY TO PROJECT
Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The proposed project will result in infilling or removal of 10 cubic meters or more of material into/from a watercourse for the proposed rehabilitation process.
GNR 324 Listing Notice 3:		
Activity 14	The development of – dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square meters; or infrastructure or structures with a physical footprint of 10 square meters or more; where such development occurs- within a watercourse; Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Rehabilitation of the wetland will include installation of up to 18 weir structures along the wetland, with the footprint of more than 10 square meters. The proposed project site has been confirmed to overlap with Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs); as identified in the Mpumalanga Biodiversity Sector Plan.

3.1.6 CONSERVATION OF AGRICULTURAL RESOURCES (NO 43 OF 1983)

Agriculture has been one of the biggest drivers of wetland loss in South Africa (Kotze et al. 1995). It is therefore noteworthy that the most powerful legal instrument to protect wetlands situated outside protected areas was the Conservation of Agricultural Resources Act (No 42 of 1983). Given the ideal growth opportunities provided by wetlands for alien species, the protections of wetlands from invasive species are implied in this legislation.

The proposed VBC08 wetland reinstatement is in line with the Act as will rehabilitate the wetland addressing both the cause and effects of degradation.

3.1.7 NATIONAL WATER ACT (NO 36 OF 1998)

The National Water Act, 1998 (Act 36 of 1998) (NWA) provides the framework to protect water resources against over exploitation and to ensure that there is water for social and economic development, human needs and to meet the needs of the aquatic environment.

A watercourse is defined in the Act as a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which or from which water flows, and any collection of water which the Minister may declare a watercourse.

Section 21 of the Act outlines a number of categories which require a water user to apply for a Water Use License (WUL) and Section 22 requires water users to apply for a General Authorisation (GA) with the DWS if they are under certain thresholds or meet certain criteria.

a. Taking water from a water resource;
b. Storage of water;
c. Impeding or diverting the flow of water in a watercourse;
d. Engaging in a stream flow reduction activity;
e. Engaging in a controlled activity;

f. Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;

g. Disposing of waste in a manner which may detrimentally impact on a water resource;

h. Disposing in any manner of water which contains waste from, or which has been heated in. any industrial or power generation process;

i. Altering the bed, banks, course or characteristics of a watercourse;

j. Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

k. Using water for recreational purposes.

The wetland reinstatement poses a risk to the Channelled Bottom Wetland during construction and therefore requires a WUL in terms of Section 21 (c) and (i) of the NWA or a GA in terms of GN 509 of 2016. A WUL associated with the impeding or diverting of flow of water and the altering of bed, banks, course or characteristics of a watercourse will be submitted to the DWS.

3.1.8 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT (NO. 10 OF 2004)

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004 within the framework of NEMA to provide for the management and conservation of national biodiversity. The NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, the NEMBA provides for the establishment and functions of a South African National Biodiversity Institute (SANBI).

SANBI was established in terms of the NEMBA with the primary purpose to report on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. The construction (including the associated infrastructure) and reinstatement of the wetland system may negatively affect the biodiversity of the system and surrounds. The MPTA will be invited to provide comment on the proposed project to ensure that mitigation measures outlined in the EMPr are deemed adequate.

3.1.9 NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by SAHRA, and lists activities which require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development.

In terms of the Section 38 of NHRA, any person who intends to undertake a linear development exceeding 300m in length or a development that exceeds 5000m^2 must notify the heritage resources authority and undertake the necessary assessment requested by that authority. The total footprint of the 18 weirs required for the proposed wetland reinstatement project is not anticipated to exceed a 5000m^2 footprint which therefore excludes the need of a Heritage Impact Assessment (HIA).

3.2 PROVINCIAL CONTEXT

3.2.1 MPUMALANGA PROVINCIAL SPATIAL DEVELOPMENT FRAMEWORK

The Spatial Development Framework (SDF) is a transformation tool that guides the form and location of future spatial development in a manner that addresses the imbalances of the past. One of the Mpumalanga SDF objective focuses on the conservation of natural resources and biodiversity through management of water resources and the

protection of ecological infrastructure. Based on the initial sensitivity screening undertaken, the proposed project site is classified as CBAs and ESAs; as identified in the Mpumalanga Biodiversity Sector Plan. The proposed development is aligned with the objectives of the framework as it seeks to improve the current state of the wetland.

3.2.2 MPUMALANGA BIODIVERSITY SECTOR PLAN

The Mpumalanga Biodiversity Sector Plan (MPSP) states that biodiversity hotspots and ecological corridors should be treated as special Biodiversity Management Zones and must be actively protected managed and enhanced. Wetlands are seen as Strategic Water Source Areas (SWA) that must be protected and mapped and included in planning policies such as the MPSP. The proposed reinstatement of the wetland system will be in line with the Provinces objective to restore and enhance these areas.

3.3 MUNICIPAL CONTEXT

The following municipal documents are relevant to this project:

- **Gert Sibande District Municipality Spatial Development Framework** aims to ensure that communities have access to environmental services that promote bio-diversity, conservation of animals and plants, promotes a balance between environmental sustainability. The proposed wetland re-instatement project is in line with the objectives of the Municipal SDF.
- **Govan Mbeki Integrated Development Plan 2019/2020** – This document emphasises the importance of protection and conservation of wetlands and grasslands as of high priority. Industrial activities have a large negative impact on the natural environment, especially water quality.
- **Govan Mbeki Spatial Development Framework (2014 -2034)** - The conservation of wetlands and grasslands for conservation need to be high priority.

4 SCOPE OF WORK AND METHODOLOGY

4.1 PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the EIA Regulations, 2014 (as amended), the objective of the impact assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—
  - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
  - The degree to which these impacts—
    - Can be reversed;
    - May cause irreplaceable loss of resources; and
    - Can be avoided, managed or mitigated
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
  - Identify and motivate a preferred site, activity and technology alternative;
  - Identify suitable measures to avoid, manage or mitigate identified impacts; and
  - Identify residual risks that need to be managed and monitored.

4.2 APPLICATION

The application phase consisted of completing the appropriate application form as well as the subsequent submission and registration of the application for EA with the MDARDLEA. The application form was submitted to MDARDLEA on **7 September 2020**. A reference number will be included in the Final BA Report following acknowledgement of receipt from the MDARDLEA. WSP will notify a number of commenting authorities of the proposed project via a notification letter and by submitting the Draft BA Report. The commenting authorities include:

- DWS;
- Vaal WMA;
- SAHRA;
- Mpumalanga Heritage Resources Authority;
- MTPA;
- Gert Sibande District Municipality; and
- Govan Mbeki Local Municipality

WSP will collate comments received during the public review phase (**8 September to 11 October 2021**) and compile a Comments and Responses Report (CRR) that will be included in the Final BA Report.

4.3 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery and mapping. The specialist team undertook site investigations during June 2020 to verify the desktop reviewed information.

4.4 IMPACT ASSESSMENT METHODOLOGY

The BA Report uses a methodological framework developed by WSP to meet the combined requirements of international best practice and NEMA, Environmental Impact Assessment Regulations, 2014, as amended (GN No. 326).

As required by the EIA Regulations (2014) as amended, the determination and assessment of impacts is based on the following criteria:

- Nature of the Impact;
- Significance of the Impact;
- Consequence of the Impact;
- Extent of the impact;
- Duration of the Impact;
- Probability if the impact;
- Degree to which the impact:
    - can be reversed;
    - may cause irreplaceable loss of resources; and
    - can be avoided, managed or mitigated.

Following international best practice, additional criteria have been included to determine the significant effects. These include the consideration of the following:

- Magnitude: to what extent environmental resources are going to be affected;
- Sensitivity of the resource or receptor (rated as high, medium and low) by considering the importance of the receiving environment (international, national, regional, district and local), rarity of the receiving environment, benefits or services provided by the environmental resources and perception of the resource or receptor); and
- Severity of the impact, measured by the importance of the consequences of change (high, medium, low, negligible) by considering inter alia magnitude, duration, intensity, likelihood, frequency and reversibility of the change.

It should be noted that the definitions given are for guidance only, and not all the definitions will apply to all of the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

4.4.1 METHODOLOGY

Impacts are assessed in terms of the following criteria:

a) The **nature**; a description of what causes the effect, what will be affected and how it will be affected.

Table 4-1: Nature or Type of Impact

NATURE OR TYPE OF IMPACT	DEFINITION
Beneficial / Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Adverse / Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct	Impacts that arise directly from activities that form an integral part of the Project (e.g. new infrastructure).
Indirect	Impacts that arise indirectly from activities not explicitly forming part of the Project (e.g. noise changes due to changes in road traffic resulting from the operation of Project).
Secondary	Secondary or induced impacts caused by a change in the Project environment (e.g. employment opportunities created by the supply chain requirements).
Cumulative	Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

b) The **physical** extent.

Table 4-2: Physical Extent Rating of Impact

Score	Description
1	the impact will be limited to the site;
2	the impact will be limited to the local area;
3	the impact will be limited to the region;
4	the impact will be national; or
5	the impact will be international;

c) The **duration**, wherein it is indicated what the lifetime of the impact will be:

Table 4-3: Duration Rating of Impact

Score	Description
1	of a very short duration (0 to 1 years)
2	of a short duration (1 to 5 years)
3	medium term (5–15 years)
4	long term (> 15 years)
5	Permanent

d) **Reversibility:** An impact is either reversible or irreversible. A scale of the level of reversibility if an impact is reversible and how long before impacts on receptors cease to be evident.

Table 4-4: Reversibility of Impact

Score	Description
1	The impact is immediately reversible.
3	The impact is reversible within 2 years after the cause or stress is removed.
5	The activity will lead to an impact that is in all practical terms permanent.

e) The **magnitude** of impact on ecological processes, quantified on a scale from 0-5, where a score is assigned.

Table 4-5: Magnitude Rating of Impact

Score	Description
0	small and will have no effect on the environment.
1	minor and will not result in an impact on processes.
2	low and will cause a slight impact on processes.
3	moderate and will result in processes continuing but in a modified way.
4	high (processes are altered to the extent that they temporarily cease).
5	very high and results in complete destruction of patterns and permanent cessation of processes.

f) The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:

Table 4-6: Probability Rating of Impact

Score	Description
1	very improbable (probably will not happen).
2	improbable (some possibility, but low likelihood).
3	probable (distinct possibility).
4	highly probable (most likely).
5	definite (impact will occur regardless of any prevention measures).

g) The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;

h) The **status**, which is described as either positive, negative or neutral;

i) The degree to which the impact can be **reversed**;

j) The degree to which the impact may cause **irreplaceable loss** of resources; and

k) The degree to which the impact can be **mitigated**.

The significance is determined by combining the above criteria in the following formula:

Significance = (Extent + Duration + Reversibility + Magnitude) x Probability

$$S = (E + D + R + M) \times P]$$

Where the symbols are as follows:

Table 4-7: Symbol Reference

Symbol	Criteria	Description
S	Significance Weighting	Refer to **Table 4-1**
E	Extent	Refer to **Table 4-2**
D	Duration	Refer to **Table 4-3**
R	Reversibility	Refer to **Table 4-4**
M	Magnitude	Refer to **Table 4-5**Error! Reference source not found.
P	Probability	Refer to **Table 4-6**

The significance weightings for each potential impact are as follows:

Table 4-8: Significance Ratings

OVERALL SCORE	SIGNIFICANCE RATING (NEGATIVE)	SIGNIFICANCE RATING (POSITIVE)	DESCRIPTION
< 30 points	**Low**	**Low**	where this impact would not have a direct influence on the decision to develop in the area
31 - 60 points	**Medium**	**Medium**	where the impact could influence the decision to develop in the area unless it is effectively mitigated
> 60 points	**High**	**High**	where the impact must have an influence on the decision process to develop in the area

4.4.2 MITIGATION MEASURES

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact, and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures, and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this BA Report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. In the event that this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. In the event that

impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail in order to remedy high/significant residual negative impacts. If no offsets can be done on a potential impact which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 4-1** below.

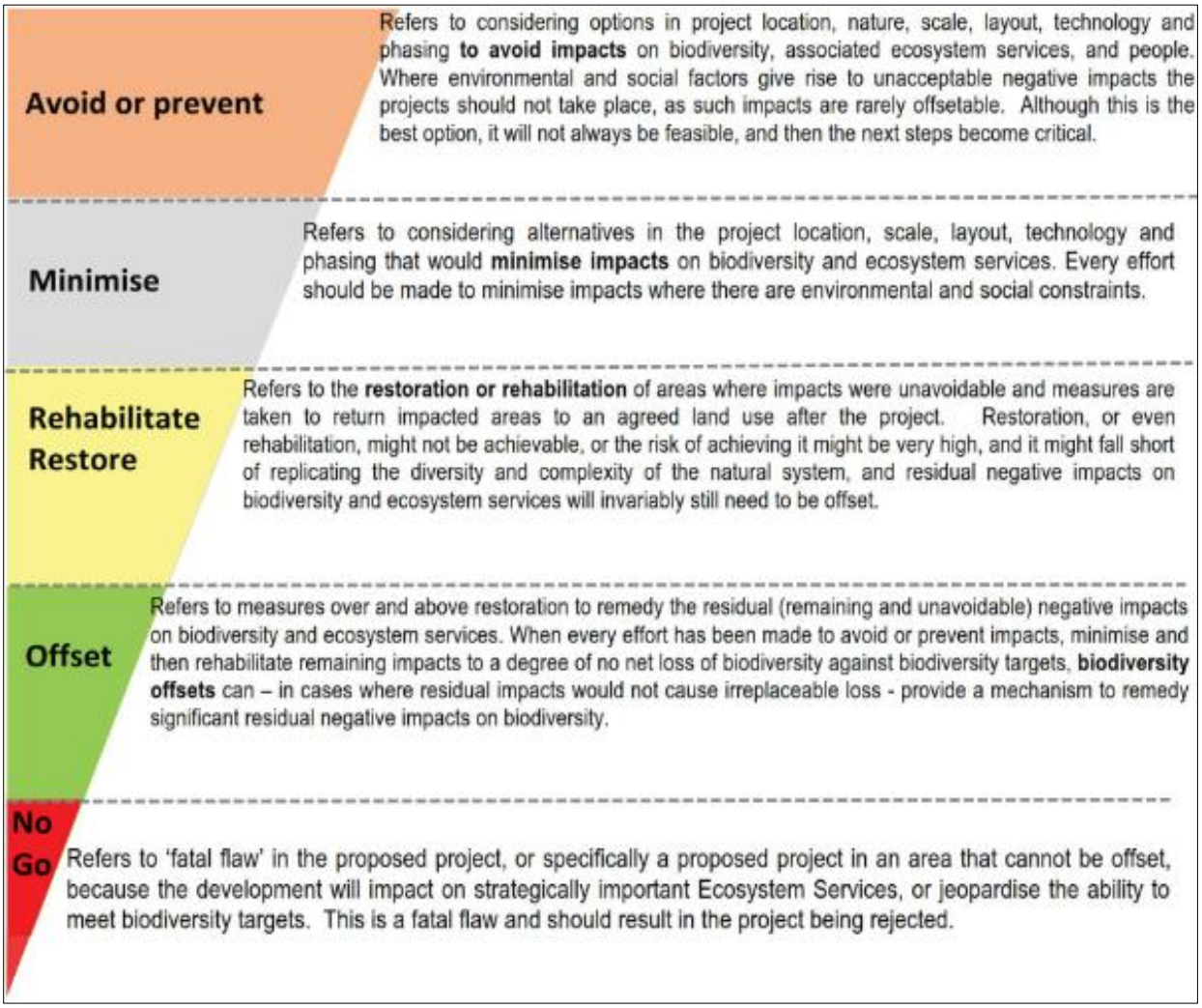


Figure 4-1: Mitigation Sequence/Hierarchy

5 STAKEHOLDER ENGAGEMENT PROCESS

5.1 PURPOSE OF STAKEHOLDER ENGAGEMENT

Stakeholder Engagement is understood to be a series of inclusive and culturally appropriate interactions aimed at providing interested and affected parties (I&APs) with opportunities to express their views, so that these can be considered and incorporated into the decision-making process, if required. Effective public participation requires the prior disclosure of relevant and adequate project information to enable I&APs to understand the risks, impacts, and opportunities of the project. The following was undertaken as part of the Stakeholder Engagement Process for the BA process:

Basic reasons why the involve public should get involved in the BA Process:

- The environment is held in public trust; therefore use of environmental resources is everyone's concern in line with the Constitution.
- Public participation is proper, fair conduct in public decision-making activities. Focus on vulnerable and disadvantaged person and offer equitable participation due to historical issues.
- A way to ensure that projects meet the citizens' needs and are suitable to the affected public.
- Finally, the final decision is informed when local knowledge and values are included and when expert knowledge is publicly examined.

5.1.1 OBJECTIVES

The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the authorised project;
- Clearly outline the scope of the project, including the scale and nature of the existing and proposed activities;
- Identify viable project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by I&APs;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the project, issues and solutions.

5.1.2 WHAT IS AN INTERESTED AND AFFECTED PARTY?

An I&AP is defined as any person, group of persons or organisations interested in or affected by an activity, and any organ of state that may have jurisdiction over any aspect of the activity.

RIGHTS, ROLES AND RESPONSIBILITIES OF THE I&AP

In terms of Chapter 6, specifically Section 43(1) of the NEMA EIA Regulations 2014, as amended registered I&APs have the right to bring to the attention of the CA any issues that they believe may be of significance to the consideration of the application. The rights of I&AP are qualified by certain obligations, namely:

- I&APs must ensure that their comments are submitted within the timeframes that have been approved by the MDARDLEA, or within any extension of a timeframe agreed by the applicant, EAP or CA; and
- Disclose to the EAP any direct business, financial, personal or other interest that they might have in the approval or refusal of the application.

In order to participate effectively, I&APs should:

- Become involved in the process as early as possible;
- Register as a I&AP;
- Advise the EAP of other I&APs who should be consulted;
- Follow the process once it has been concluded;
- Read the material provided and actively seek to understand the issues involved;
- Give timeous responses to correspondence;
- Be respectful and courteous towards other I&APs;
- Refrain from making subjective, unfounded or ill-informed statements; and
- Recognise that the process is confined to issues that are directly relevant to the application

5.2 I&AP IDENTIFICATION AND NOTIFICATION

Section 41 of the EIA Regulations (2014), as amended states that written notices must be given to identified I&APs as outlined in **Table 5-1**.

Relevant authorities (Organs of State) have been automatically registered as I&APs. In accordance with the EIA Regulations, (2014), as amended, all other persons must request in writing to be placed on the register, submit written comments or attend meetings in order to be registered as I&APs and included in future communication regarding the project.

Appendix E1 provides a list of I&APs registered on the project database. I&APs were identified through several mechanisms. These include:

- Utilising the project's existing database;
- Obtaining the latest municipal ward councillor details through the municipality;
- Pre-identified project key I&APs such as the Govan Mbeki Local Municipality, the Gert Sibande District Municipality and other commenting authorities;
- Advertising in the press (**Appendix E2**); and
- Placement of site and community notices **(Appendix E3).**

Table 5-1: Interested and Affected Parties Table

NEMA REQUIREMENT	DISCUSSION
(i) the owner or person in control of that land if the applicant is not the owner or person in control of the land	The project activity is located currently located on Sasol owned land.
(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken	
(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken	Adjacent landowner and occupier details were collected, and the landowners were notified via a project notification letter via email and/or SMS notification (**Appendix E4).**
(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area	Ward Councillor of Ward 5 (Govan Mbeki Local Municipality) have been included on the I&AP database. (**Appendix E1**)
(v) the municipality which has jurisdiction in the area	Govan Mbeki Local Municipality and Gert Sibande District Municipality have been included on the I&AP database **(Appendix E1).**

NEMA REQUIREMENT	DISCUSSION
(vi) any organ of state having jurisdiction in respect of any aspect of the activity	The MDARDLEA has been consulted as the competent authority.
(vii) any other party as required by the competent authority.	All tiers of government, namely, national, provincial, local government and parastatals have been included on the I&AP database. Inclusive of: — DWS; — SAHRA; — Mpumalanga Heritage Resources Authority; — MTPA.

The stakeholder engagement process is outlined in **Table 5-2**. This table will be updated in the Final BA Report.

Table 5-2: Stakeholder Engagement Process

NO.	ITEMS	CURRENT STATUS	DESCRIPTION	COMPLIANCE WITH CHAPTER 6 OF THE EIA REGULATIONS (2014) AS AMENDED
1	Newspaper adverts in a local newspaper introducing the project and requesting public input.	Complete	WSP have placed an English, Afrikaans and Zulu advert in the Ridge Times (8 September 2021). A copy of the advert is included in **Appendix E2.** Proof of the advert placement will be included in the Final Report.	Regulation 41 (2) (c)
2	On-site notices placed at strategic locations.	Complete	Site notices have been placed along the boundary fence of the project site and at various locations in Secunda. A copy of the site notice is included in **Appendix E3.** Proof of the site notice placement will be included in the Final Report.	Regulation 41 (2) (a)
3	Notification letters were distributed (emailed and faxed) to the existing I&AP database.	Complete	Notification letters of the Environmental Authorisation process and availability of the Draft BA Report have been distributed to I&APs via email. In addition, I&APs will be notified via sms. A copy of the notification letter is included in **Appendix E4.** Proof of distribution will be included in the Final Report.	Regulation 41 (2) (b)

NO.	ITEMS	CURRENT STATUS	DESCRIPTION	COMPLIANCE WITH CHAPTER 6 OF THE EIA REGULATIONS (2014) AS AMENDED
4	The Draft Report was delivered to the Secunda Public Library and the Govern Mbeki Local Municipal Offices for I&AP review. The Draft Report were also be made available on the WSP website.	Complete	The reports will be distributed to the public venues for review and will be available from 8 September to 11 October 2021. Additionally, an electronic version of the report was placed on the WSP website to be accessed by the public at the following link: https://www.wsp.com/en-ZA/services/public-documents	Regulation 43
5	All I&AP comments will be used to update the Draft Report before MDARDLEA submission.	Not yet applicable	No comments have been received to date. This will be updated in the Final Report which will be submitted to the MDARDLEA for decision making. Furthermore, in accordance with the regulations a comments and responses report will be compiled and will be included in the Final Report.	Regulation 44
6	Submission and Decision-Making	Not yet applicable	The MDARDLEA is allocated 107 days to review the Final BA Report.	-
7	EA and appeal phase	Not yet applicable	Notify I&APs of the amended decision and their right to appeal.	-

6 BASELINE ENVIRONMENTAL

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed project is located. It is important to gain an understanding of the Project area and its surroundings, as it will provide for a better understanding of the receiving environment in which the Project is being considered.

The description of the baseline environment is essential as it represents the conditions of the environment before the construction of the proposed Project (i.e. the current, or status quo, environment) against which environmental impacts of the proposed Project can be assessed and future changes monitored.

Some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been supplemented or generated by specialists appointed to undertake baseline and impact assessments for the proposed Project. The aspects of the receiving environment included in this section are outlined in **Table 6-1.**

Table 6-1: Characteristics of the receiving environment

RECEIVING ENVIRONMENT	CHARACTERISTICS
Biophysical	– Climate – Topography – Geology and Soils – Water Resources (including surface water, wetlands and groundwater) – Biodiversity (including vegetation, habitats, and fauna)
Social and Economic	– Ambient Air Quality – Ambient noise – Cultural and Heritage – Palaeontology – Socio-Economic

6.1 BIOPHYSICAL ENVIRONMENT

6.1.1 CLIMATE

TEMPERATURE

The project site lies to the south west of Secunda, which is 1619m above sea level. The climate in this region is usually moderate, wet during summer, cold and dry during the winter, and classified as Category “C” under the Koppen Climate Classification. SO site falls into under subcategory “Cwb” within the C category. The annual average temperature is 15.2℃ with maximum temperature reaching 37.2℃. The average monthly temperature data is outlined below in **Table 6-2.**

Table 6-2: Average Temperature (https:/en.climate-data.orgData)

MONTH	JAN	FEB	MARC	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average Temperature ℃	20	19.6	18.4	15.3	12	8.8	8.9	11.8	15.3	17.7	18.5	19.5
Min Temperature in ℃	13.7	13.3	11.8	8.1	3.7	0	0	2.7	6.7	10.2	11.9	13.1

MONTH	JAN	FEB	MARC	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Maximum Temperature °C	26.4	25.9	25.1	22.6	20.3	17.6	17.9	20.9	23.9	25.2	25.1	26

PRECIPITATION

The proposed site lies in the summer rainfall region of South Africa, receiving a total annual average rainfall of 620mm. The highest average rainfall is typically recorded in January and the lowest recorded in July. The annual average monthly rainfall data is shown in **Figure 6-1.**

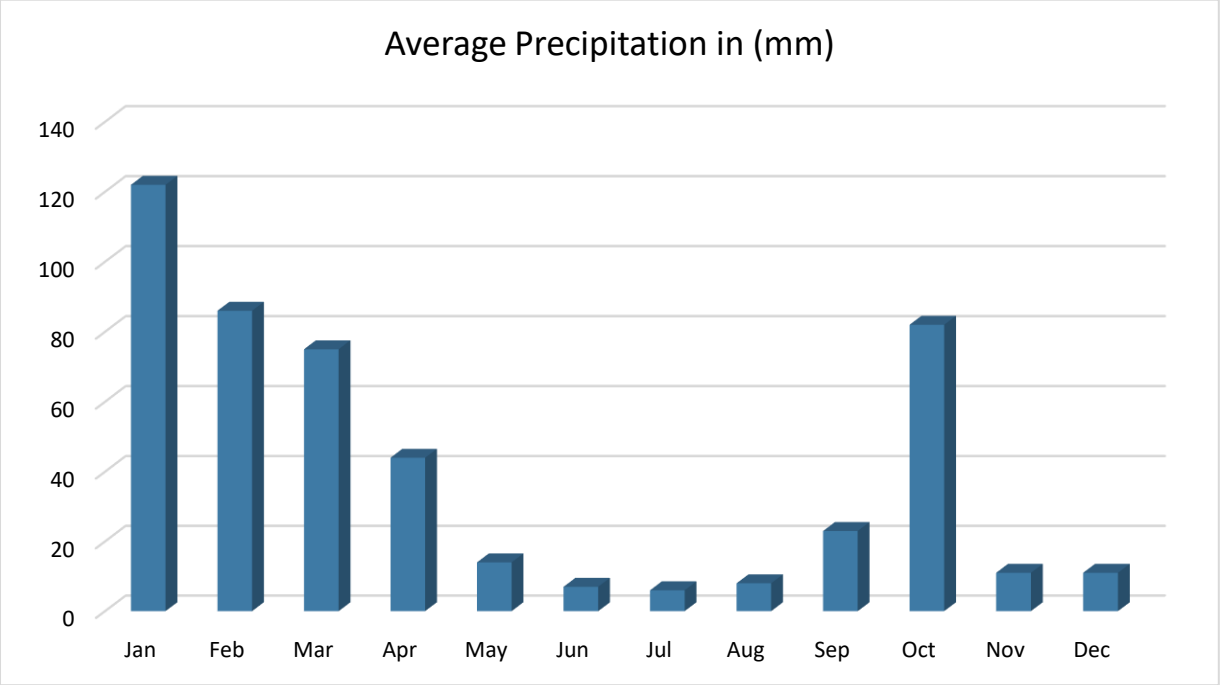


Figure 6-1: Rainfall in Secunda (https:/en.climate-data.org)

WINDS

The prevailing wind direction is from the northeast and east-northeast with lower occurrences of winds blowing from the north, west-northwest and east-southeast. **Figure 6-2** below shows how many hours per year the wind blows from a particular direction around the area. The average wind speeds for daytime periods are 3.44m/s with calms of 3.44%. The average wind speed during the night is 2.64m/s with calms of 10.84%.

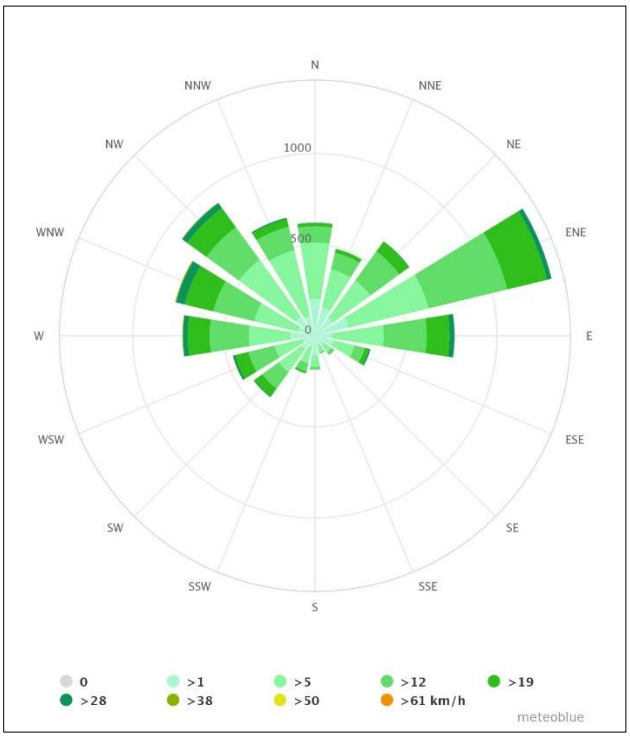


Figure 6-2: Wind Rose (www.meteoblue.com)

6.1.2 TOPOGRAPHY

The regional topography in Secunda consists of flat plains and local shallow drainage valleys. The SIC's topography can be classed as gently undulating with a very low gradient dropping down to the east of Sasol Operations. The site is gently flat with and elevation of 1600 masl. The elevation profile of the wetland system is illustrated in **Figure 6-3**.

Figure 6-3: Elevation profile of the VBC08 Wetland System

6.1.3 GEOLOGY AND SOILS

The geology within the project site mainly consists of the Vryheid Formation that is part of the Ecca Group (Karoo Supergroup). Apart from the dominant lithologies sandstone, siltstone and mudstone there are also dolerite sills and in places dykes as from the Jurassic period as well as younger alluvial deposits within the proposed site **Figure 6-4.**

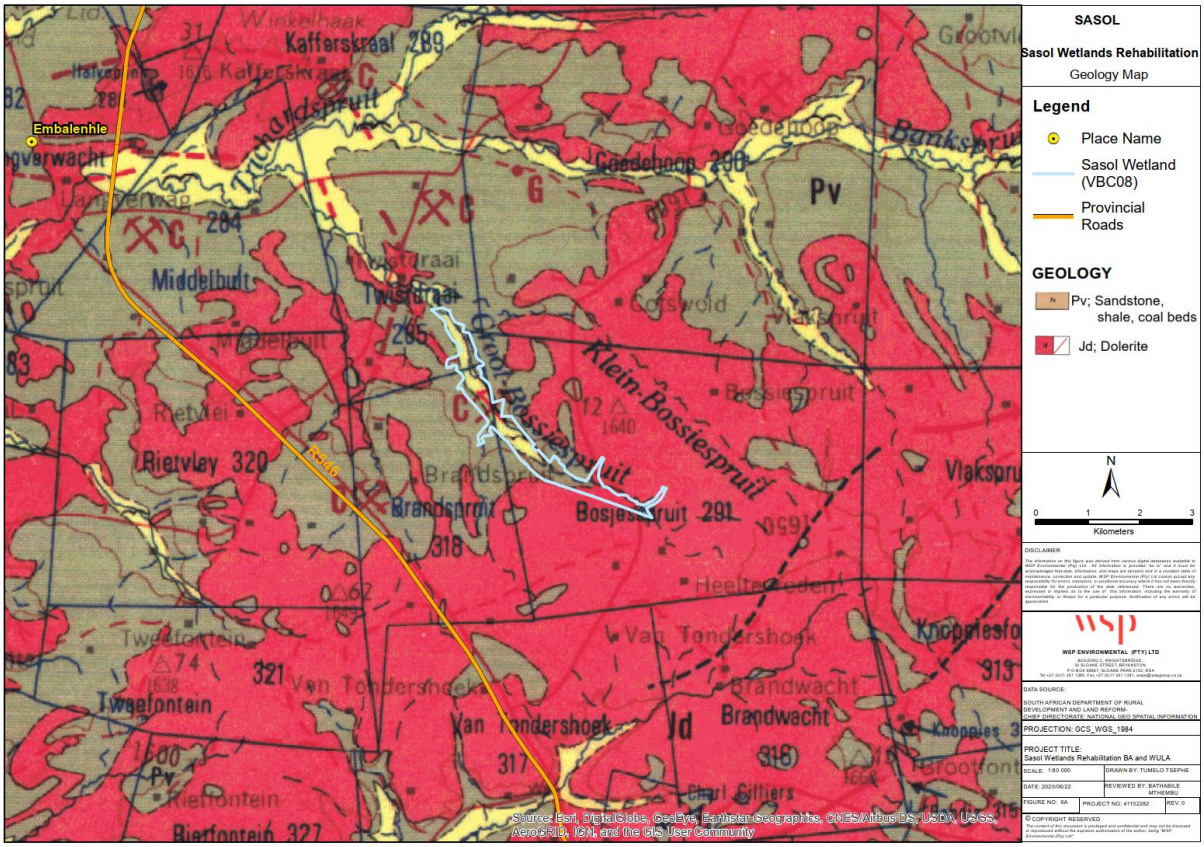


Figure 6-4: Geology and Soils (WSP GIS, 2020)

The soil forms within the study area are illustrated in **Figure 6-5**. "Wet" and "dark clay" soils occur throughout the area and their distribution is determined by the topography. Deep and waterlogged soils occupy the valley bottom areas of the landscape.

The Katspruit and Bonheim soil forms are found on the midslope. The Katspruit can be classified as a "wet soil", while the Bonheim can be classified as a "dark clay or "intermediate" soil. The Katspruit soil form is commonly found in the valley-bottom of the hillslope, however it occurs in the midslope of the catena, where there is a slight "plateau" in the topography. The Bonheim soil form dominates the midslope of the catena.

The most common soil found in the wetlands of the study area is the Rensburg soil form, which is a dark strongly structured clay soils that have a high base status. Red and dark clays occur on the dolerite parent material, which provides the basic cations needed for clay formation. The Rensburg soil form is a hydromorphic soil, which is characterised by its vertic A horizon topsoil overlaying a G horizon. It is a typically poorly drained soil which often has a sandy-clay-loam topsoil and a sandy-clay to clay subsoil. The underlying hydromorphic G horizon occurs at shallow depths and forms owing to either a fluctuating water table or a permanent water table.

Figure 6-5: Soil form within Catena

6.1.4 WATER RESOURCES

SURFACE WATER

The project site falls within the Upper Vaal WMA and Upstream Vaal Dam sub-WMA within the quaternary catchment of C12D (**Figure 6-6**). The Vaal River originates on the Eastern Escarpment, north-east of Ermelo, and flows west, through the Mpumalanga Highveld, where it is dammed by the Grootdraai Dam near Standerton, from where water supply for industrial use at the SIC is obtained. Downstream from the Grootdraai Dam, the Vaal River is joined by the Klip River and the Waterval River, and further downstream, at the confluence of the Vaal River with the Wilge River, the Vaal Dam has been constructed. Downstream of the Vaal Dam a number of tributaries draining the Gauteng, Northwest and Free State Provinces (including the Suikerbosrant River, the Klip Spruit, the Riet Spruit, the Taaibos Spruit, the Mooi River, the Renoster Spruit, the Skoon Spruit, and the Vals River) join the Vaal River, which flows further to the north-west, west, and south-west, until it is dammed by the Bloemhof Dam at its confluence with the Vet River. Downstream from the Bloemhof Dam, it continues in a slightly more south-westerly direction, and is joined by the Harts River and the Riet River, before its confluence with the Orange River at Douglas, some 700 km from its origin. Drainage in Quaternary catchment C12D is as follows:

- The Waterval River originates just south of the town of Leandra, some 30 km to the north-west of the SIC. Following its confluence with the Rol Spruit, it is joined by the Groot Spruit, which originates to the north of the town of Evander. The main tributary of the Groot Spruit is the Klein Spruit, which drains the area where the SIC is located.
- The Klein Spruit is formed by the confluence of the Trichardt Spruit and the Bossie Spruit.
- The Trichardt Spruit flows from the north, draining the town of Secunda, and is joined from the east by the Klip Spruit, which roughly follows the northern boundary of the SIC Primary Area.
- The Bossie Spruit roughly forms the southern boundary of the Primary Area, and has two tributaries, namely the Groot-Bossie Spruit, which drains the south-east, and flows past SNF and SNE, and the Brand Spruit, which joins the Bossie Spruit from the south, and which forms the eastern boundary of the Outside Ash area.

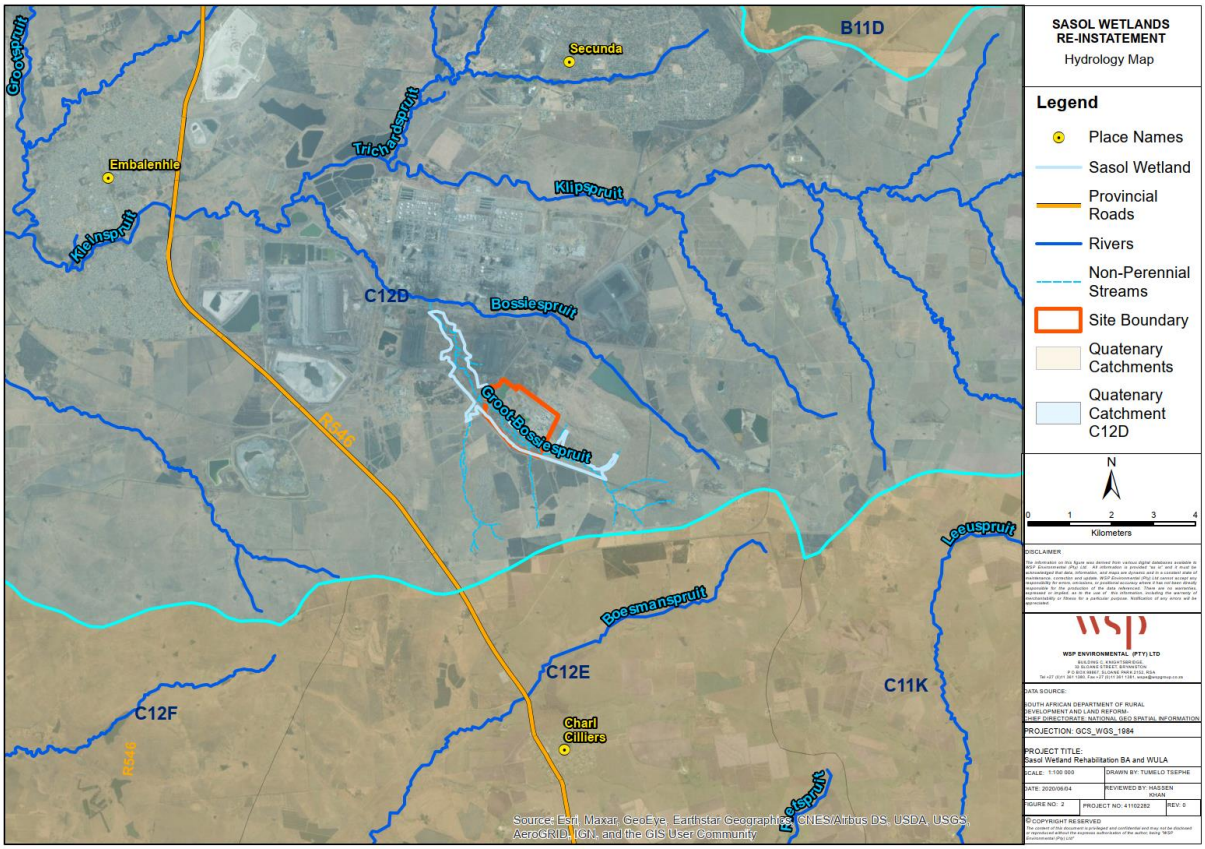


Figure 6-6: Hydrology Map (WSP GIS, 2020)

The Secunda Sewage Treatment Works (STW) is located in the Secondary Area, to the west of the West Factory. The Trichardt Spruit runs in a westerly direction past the north of the sewage treatment works. Treated effluent is discharged via an informal channel into the Trichardt Spruit. Surface water quality in this region is considered poor as a result of the activities taking place.

Surface water quality monitoring is conducted by the analysis of samples taken in surface water resources (streams), discharges into streams, and in facilities used for the containment of contaminated water.

A network of 24 sampling points ("RESM" or "Receiving Environment Surface Monitoring") has been established around the SIC in order to measure potential impacts from the various activities on the relevant surface water resources.

HYDROGEOLOGY

The groundwater at SO is characterised by two aquifers, including a weathered aquifer occurring at a depth of between 12 and 35 m below existing ground level, and a fractured rock aquifer occurring at depths greater than 60 m below existing ground level. Groundwater flows in a northerly direction towards the Klipspruit with a relatively low hydraulic gradient based on topographical elevations. The groundwater on site is characterised by a notable waste load, mainly comprising nutrients and sulphate, is seeping from the onsite dam system to the nearby Groot Bossiespruit**.**

NATIONAL BIODIVERSITY ASSESSMENT WETLANDS

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018.

Ecosystem threat status (ETS) of river ecosystem types is based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LC, with

CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer et al., 2019; Skowno et al., 2019).

Figure 6-7 shows that the wetland that runs across the project area is CR, while **Figure 6-8** shows this is a "not protected" and "poorly protected" system. A CR river which is "poorly protected" also runs through the 500 m regulated area.

Figure 6-9 shows that the wetland found in the project area is artificial, a natural wetland can however still be found in the 500 m regulated area.

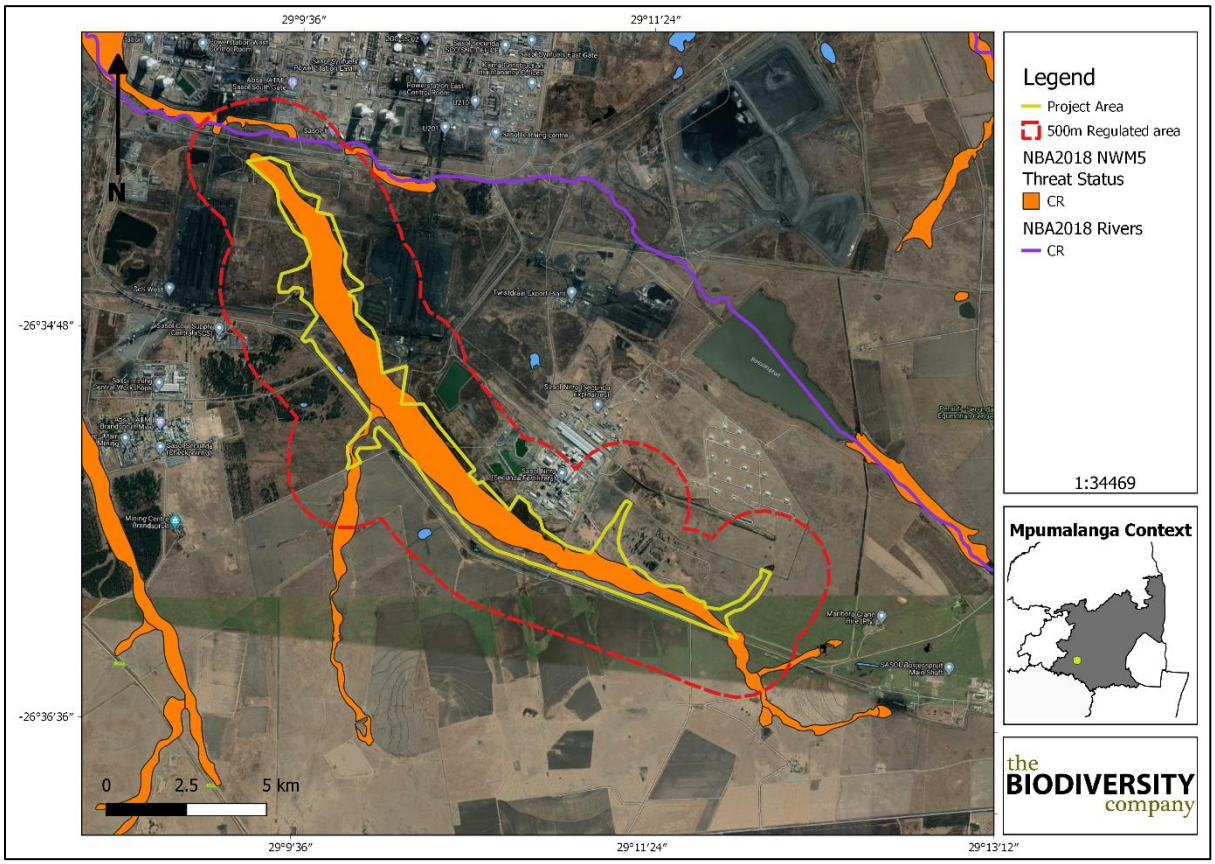


Figure 6-7: The project area in relation to the threat status of the wetlands and rivers (NBA, 2018)

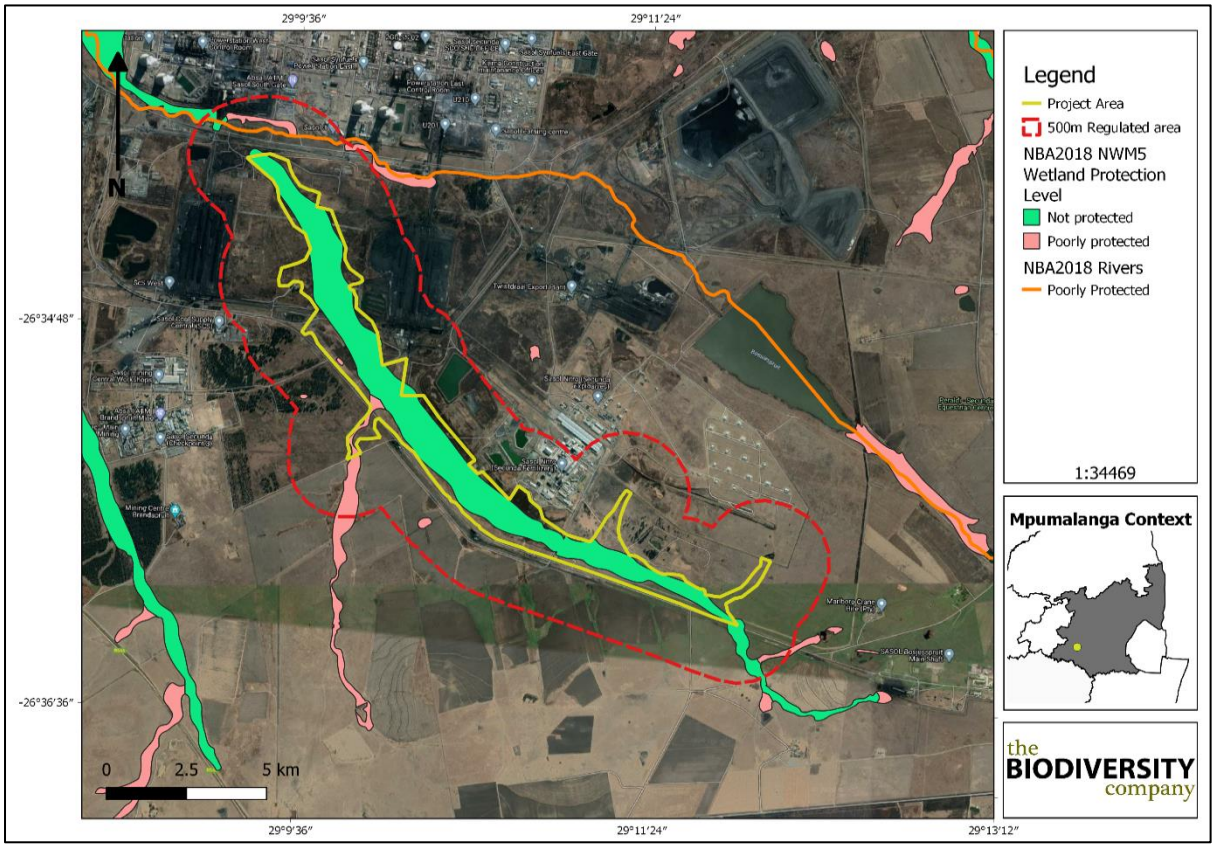


Figure 6-8: The project area in relation to the protection level of the wetlands and rivers (NBA, 2018).

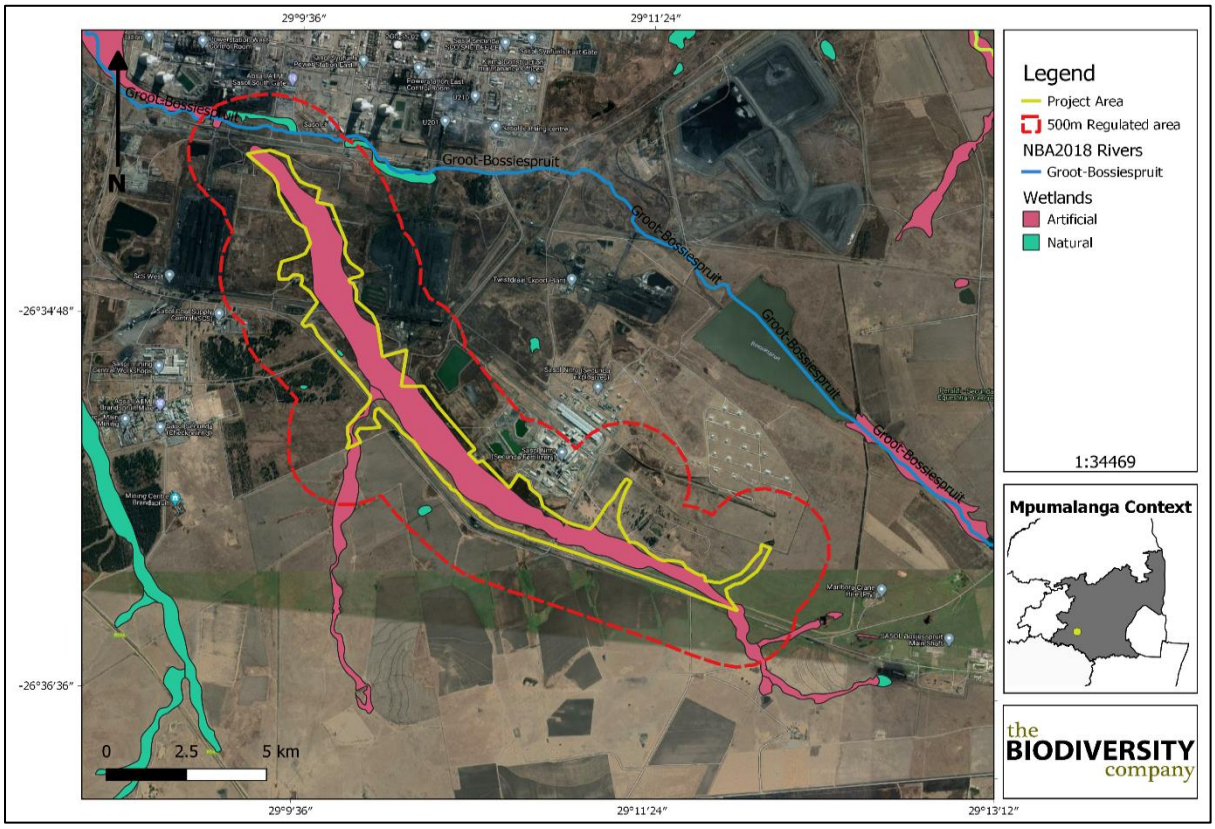


Figure 6-9: The project area in relation to the NBA rivers and rivers, divided as artificial and natural

MPUMALANGA HIGHVELD WETLANDS

The purpose of the Mpumalanga Highveld Grasslands (MPHG) Wetlands project was to:

- Ground-truth and refine the current data layers of the extent, distribution, condition and type of freshwater ecosystems in the Mpumalanga Highveld coal belt, to support informed and consistent decision-making by regulators in relation to the water-biodiversity-energy nexus;
- To incorporate these revised data layers into the atlas of high-risk freshwater ecosystems and guidelines for wetland offsets, currently being developed by SANBI, to improve the scientific robustness of these tools; and
- To support the uptake, and development of the necessary capacity to apply the data, atlas and guidelines by regulators and the coal mining industry in their planning and decision-making processes'' (SANBI, 2012).

The MPHG Wetlands data also classifies NFEPA land cover based on the defined condition of each area. These are known as the NFEPA wetland conditions categories. The categories are listed in **Table 6-3** and are represented in relation to the project area in **Figure 6-10**

Table 6-3: Description of NFEPA Wetland Conditions Categories

PES EQUIVALENT	NFEPA CONDITION	DESCRIPTION	% OF TOTAL NATIONAL WETLAND AREA*
Natural or Good	AB	Percentage natural land cover ≥ 75%	47
Moderately Modified	C	Percentage natural land cover 25-75%	18
Heavily to critically modified	DEF	Riverine wetland associated with a D, E, F or Z ecological category river	2
	Z1	Wetland overlaps with a 1:50 000 'artificial' inland water body from the Department of Land Affairs: Chief Directorate of Surveys and Mapping (2005-2007)	7
	Z2	Majority of the wetland unit is classified as 'artificial' in the wetland locality GIS layer	4
	Z3	Percentage natural land cover ≤ 25%	20

Figure 6-10 shows the project area in relation to the Mpumalanga Highveld Wetlands data as provided by SANBI. The project area intersects with wetland areas classified as EF, which means that these areas have been classified as heavily to critically modified. Some dams also occur in the 500 m regulated area.

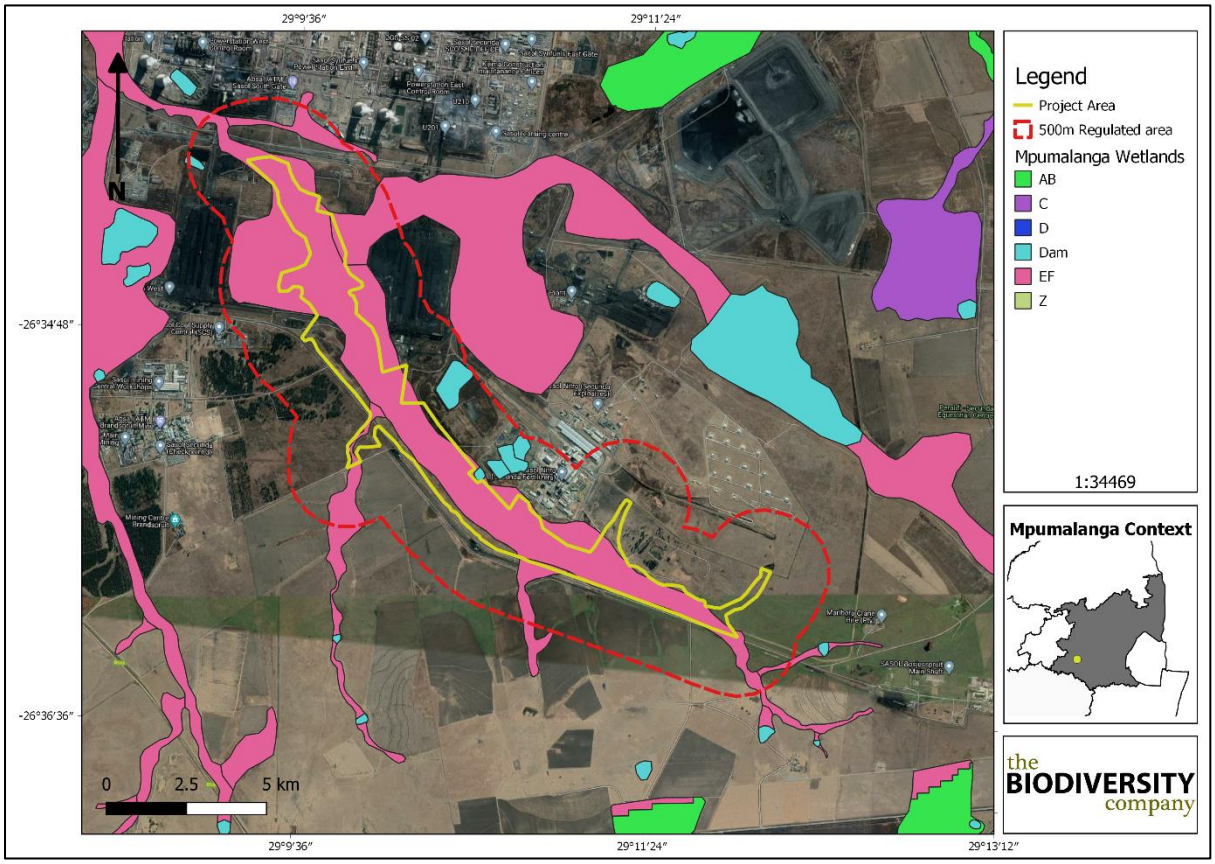


Figure 6-10: The Project Area in Relation to the Mpumalanga Highveld Wetlands

WETLAND IDENTIFICATION AND DELINEATION

The wetland area (VBC08) was delineated and assessed for the Golder Associates (2018) study for the re-instatement of the system. The extent of the delineated system remains largely consistent from the 2018 study. Studies undertaken by Wet-Earth Eco-Specs (2019 & 2020) have also been considered to present the extent of the delineated system. **Figure 6-11** presents the extent of wetland area within the 500 m regulation area, and also the two wetland habitat units identified and discussed by Wet-Earth Eco-Specs (2020).

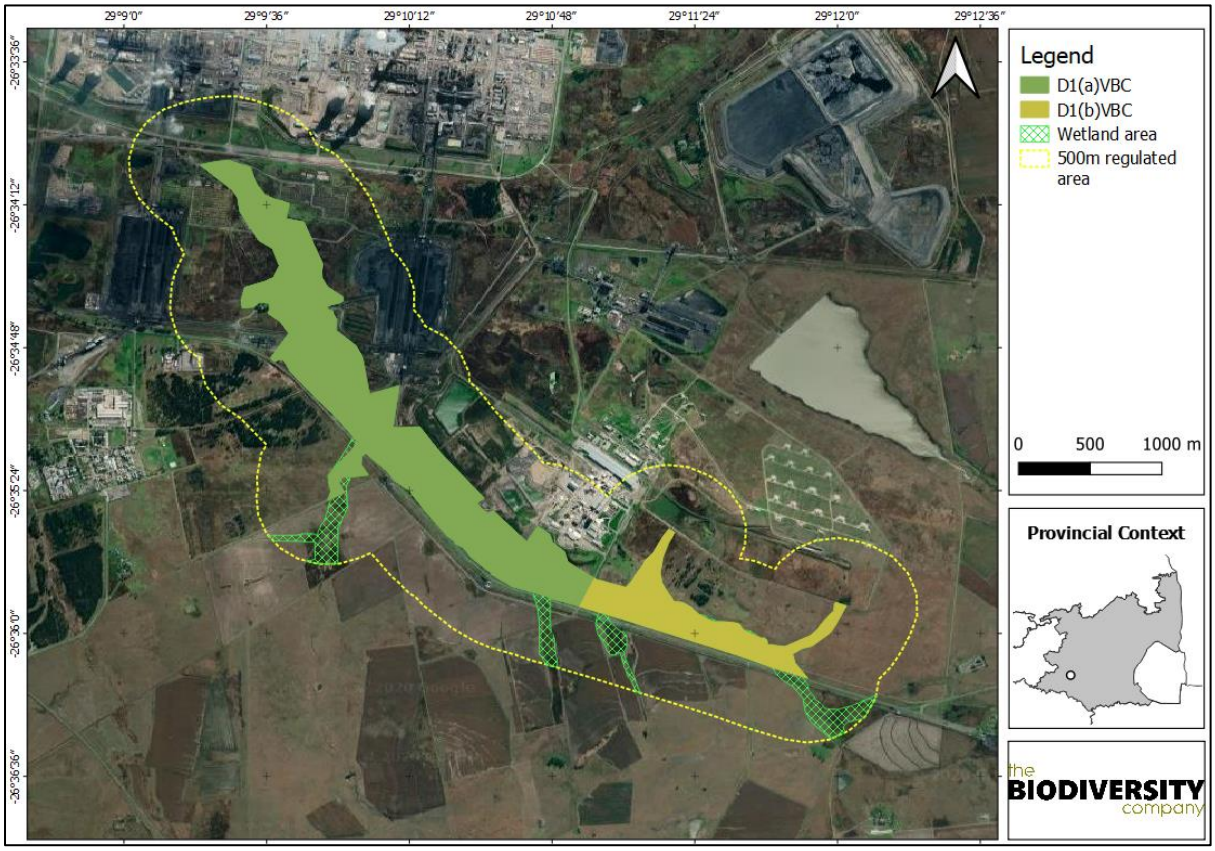


Figure 6-11: The extent of the delineated wetland system considered for the project

The VBC08 wetland systems present ecological status (PES) is a category C and E which is moderately to seriously modified **(Table 6-4** and **Table 6-5**). Table 6-5The scoring and ratings provided below are consistent with information provided in the Wet-Earth Eco-Specs (2019) report. The wetland has been severely degraded resulting ecosystem change and loss of biota. The most beneficial services are associated with regulation and supporting benefits. Aspects identified to impact on the wetland system were crossings, access routes, landscaping, mining infrastructure and operational activities.

Table 6-4: Scores for the wetland present ecological state (PES): D1 (a) VBC

Component	PES Score	PES Rating	Description
Hydrology	8.0	F	**Critically Modified**: Aspects which have contributed to modifications include; i) impoundments within the system, impeding flow and altering the flooding regimes, ii) road routes and conveyors traversing the system causing concentrated flows, iii) encroachment of infrastructure, operational area into the wetland system.
Geomorphology	7.8	E	**Seriously Modified**: Due to the extent and the encroachment into the periphery of the wetland, and within the actual system in some reaches, the structure of the system is seriously modified. The inundation caused by dams have also contributed to the altered structure of the system. The system has also been landscaped in selected reaches.
Vegetation	7.7	E	**Seriously Modified:** The local land uses have resulted in the following: i) removal of plant / vegetation due to landscaping, ii) establishment of alien vegetation due to local disturbances.
Overall	**7.58**	**E**	**Seriously Modified.** The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable**.**

Table 6-5: Scores for the wetland present ecological state (PES): D1 (b) VBC

Component	PES Score	PES Rating	Description
Hydrology	3.6	C	**Moderately Modified**: Aspects which have contributed to modifications include; i) road routes traversing the system causing concentrated flows, ii) encroachment of infrastructure into the wetland system.

Geomorphology	3.2	C	**Moderately Modified**: The altered flows have resulted in incisions in the channel at selected reaches. The development of the area has altered the catchment characteristics with some level of encroachment in close proximity to the system, with some services traversing the wetland.
Vegetation	2.8	C	**Moderately Modified:** The local land uses have resulted in the following; i) removal of plant / vegetation due to landscaping, ii) establishment of alien vegetation due to local disturbances.
Overall	**3.28**	**C**	**Moderately Modified.** A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.

The ecological importance and sensitivity (EIS) for the HGM units was calculated to be moderate (class C) and high (class B) level of importance for D1 (a) VBC and D1 (b) VBC respectively. The following findings were considered for the EIS classification:

- No priority NFEPA wetlands are directly associated with the VBC08 wetland system
- The project area is located in an EN vegetation type;
- The wetland system within the Mesic Highveld Grassland Group 3 has a critical (CR) ecosystem threat status;
- A single ESA wetland is within the footprint area of the wetland system; and
- Evidence of *Leptailurus serval* (Serval) which is listed as NT have been recorded in the project area.

The Hydrological Functionality of the wetland was determined to have a high (class B) level of importance and the Direct Human Benefits were calculated to have a low (class D) level of importance.

The wetland system was classified as having a High sensitivity while the associated buffer was assigned a Medium sensitivity. All other non-wetland areas within the 500 m regulated area were assigned a Low sensitivity from a wetland perspective and a 20m buffer is applicable for all non-essential and supporting services not required to be within the wetland **(Figure 6-12).** According to Macfarlane *et al.* (2009) in Mpumalanga, the Mpumalanga Tourism and Parks Agency typically recommends buffers of 30 m in built up areas while buffers of 20 m are typically proposed in areas of open veld (Cowden, G., pers comm.). For the purposes of this project, a 20 m buffer has been sufficient and would only be applicable for all non-essential and supporting services not required to be within the wetland.

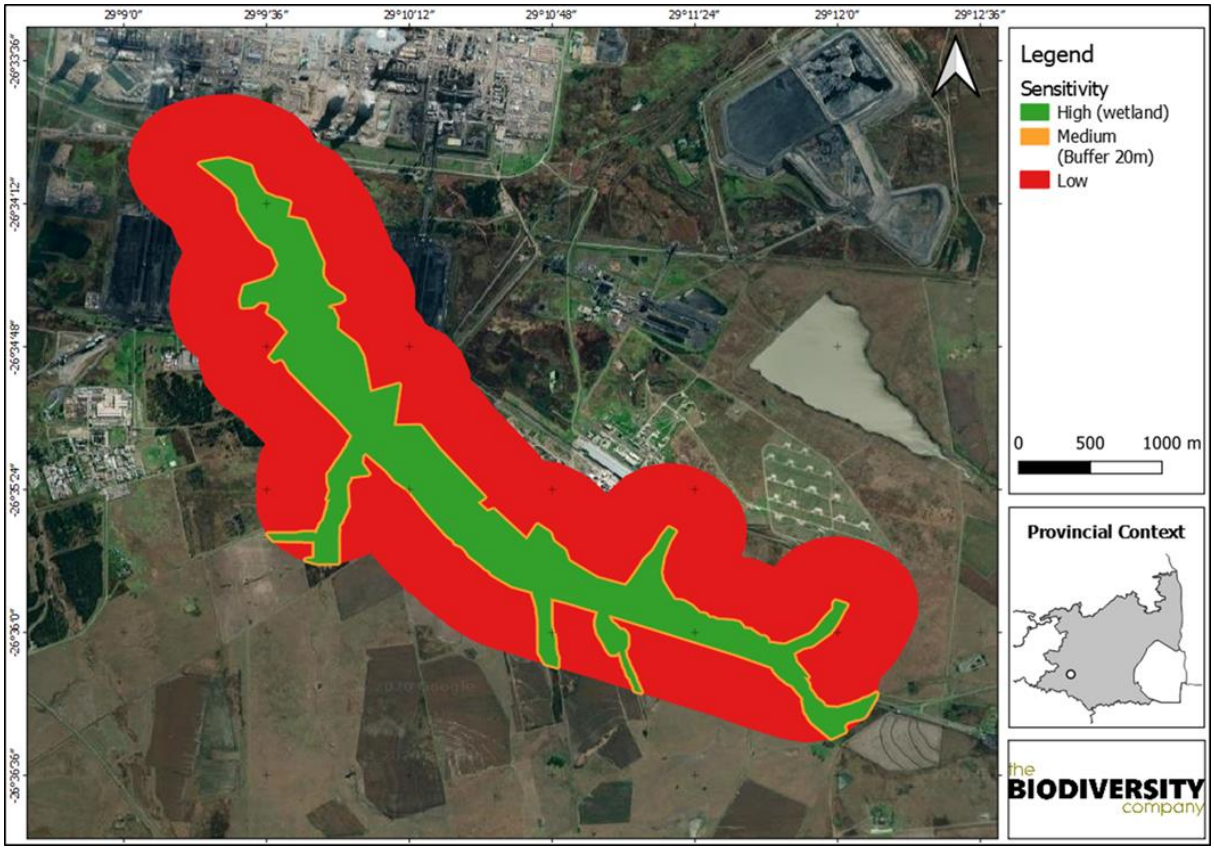


Figure 6-12: Wetland Sensitivity Map

6.1.5 BIODIVERSITY

MPUMALANGA BIODIVERSITY SECTOR PLAN

The key output of this systematic biodiversity plan is a map of biodiversity priority areas (MTPA, 2014). The Mpumalanga Biodiversity Sector Plan (MBSP) CBA map delineates Critical Biodiversity Areas, Ecological Support Areas, Other Natural Areas, Protected Areas, and areas that have been irreversibly modified from their natural state (MTPA, 2014). The MBSP uses the following terms to categorise the various land used types according to their biodiversity and environmental importance:

- Critical Biodiversity Area (CBA);
- Ecological Support Area (ESA);
- Other Natural Area (ONA);
- Protected Area (PA); and
- Moderately or Heavily Modified Areas (MMA's or HMA's).

Figure 6-13 shows the project area superimposed on the MBSP Terrestrial CBA map. Based on this, the project area will overlap with:

- Critical Biodiversity Area (CBA);
- Other Natural Area (ONA); and
- Moderately or Heavily Modified Areas (MMA's or HMA's).

Figure 6-14 shows the project area superimposed on the MBSP Freshwater CBA map. Based on this, the project area will overlap with:

- The area is dominated by ONA and HMA's);
- A single ESA wetland is within the footprint are of the wetland system; and

– A single CBA wetland is not directly within the wetland footprint area, but within the 500 m regulation area.

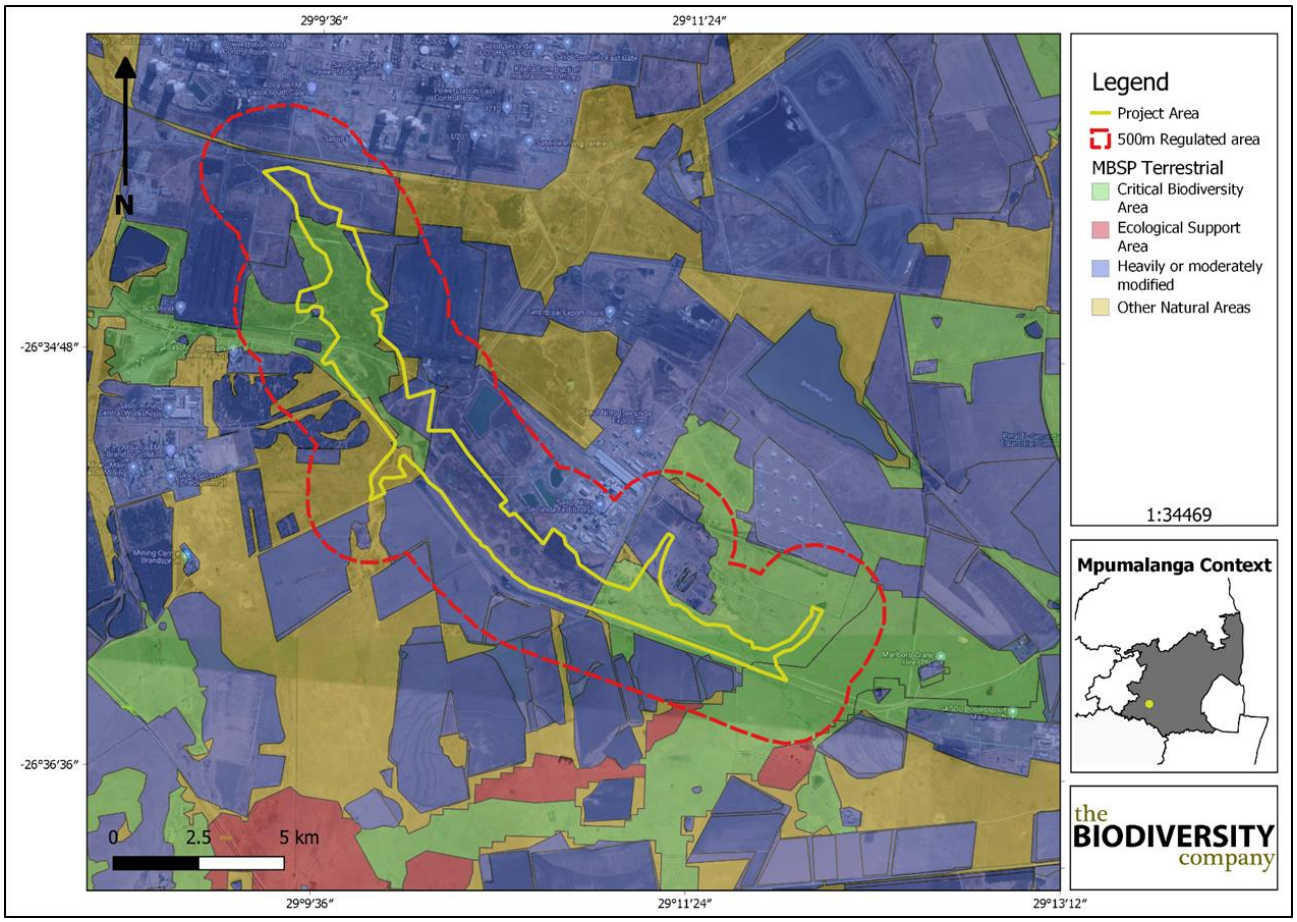


Figure 6-13: Project area in relation to the MBSP Terrestrial

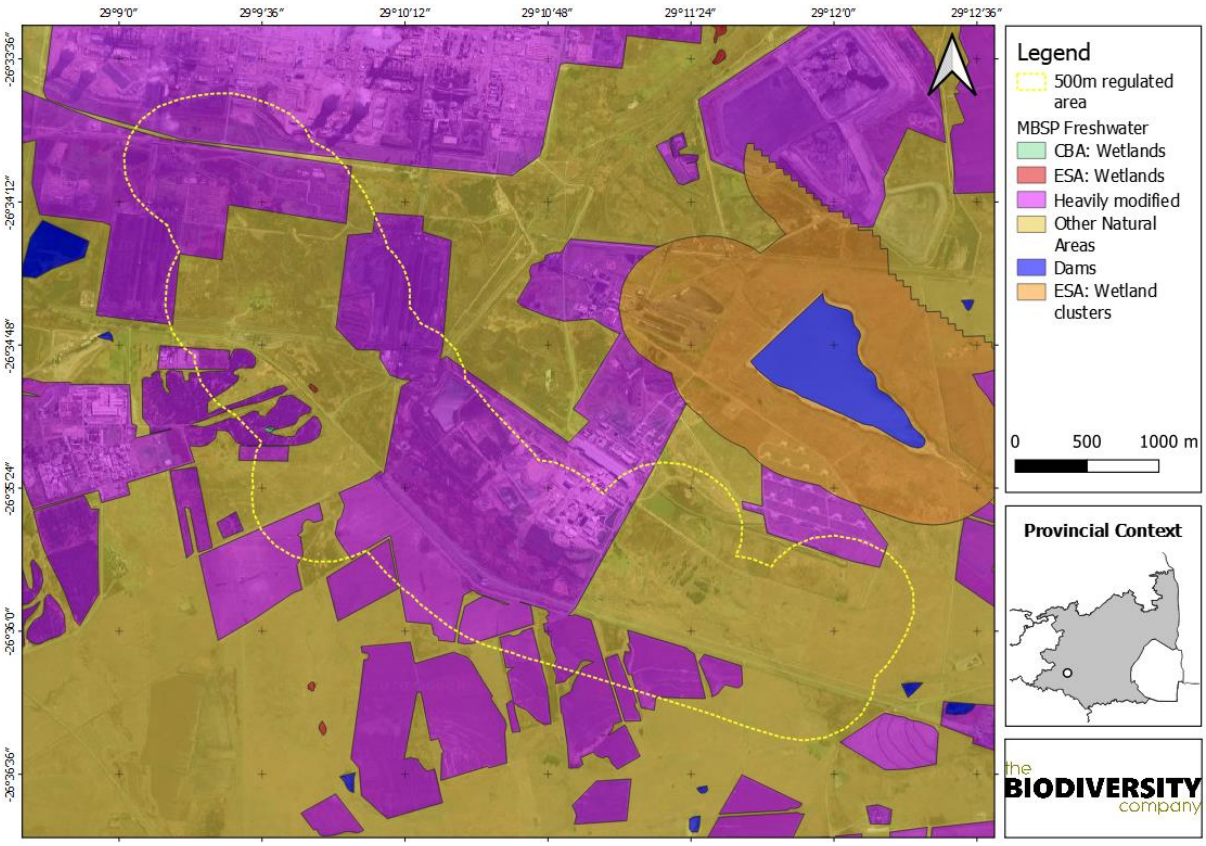


Figure 6-14: Project area in relation to the MBSP Freshwater

MPUMALANGA PROTECTED AREAS EXPANSION STRATEGIES

The Mpumalanga Protected Area Expansion Strategy (MPAES, 2013), commissioned by the MTPA, serves to function as a provincial framework for an integrated, co-ordinated and uniform approach in the expansion and consolidation of the Provincial PAS, in line with the requirements of the NPAES.

The priority areas for PA Expansion within Mpumalanga were spatially established based on the premise that the primary goal of these areas is to protect biodiversity targets. Several biodiversity data sources were used for the assessment, namely the: Threatened Ecosystems, MBCP Terrestrial Assessment, MBCP Aquatic Assessment, MBCP Irreplaceability, C-plan Irreplaceability, and the National Spatial Biodiversity Assessment Priority areas. A combination of all these were used, together with the spatial priorities established within the NPAES, to establish the spatial priority areas that will guide the MPAES over the next 20 years as reflected below **Figure 6-15**.

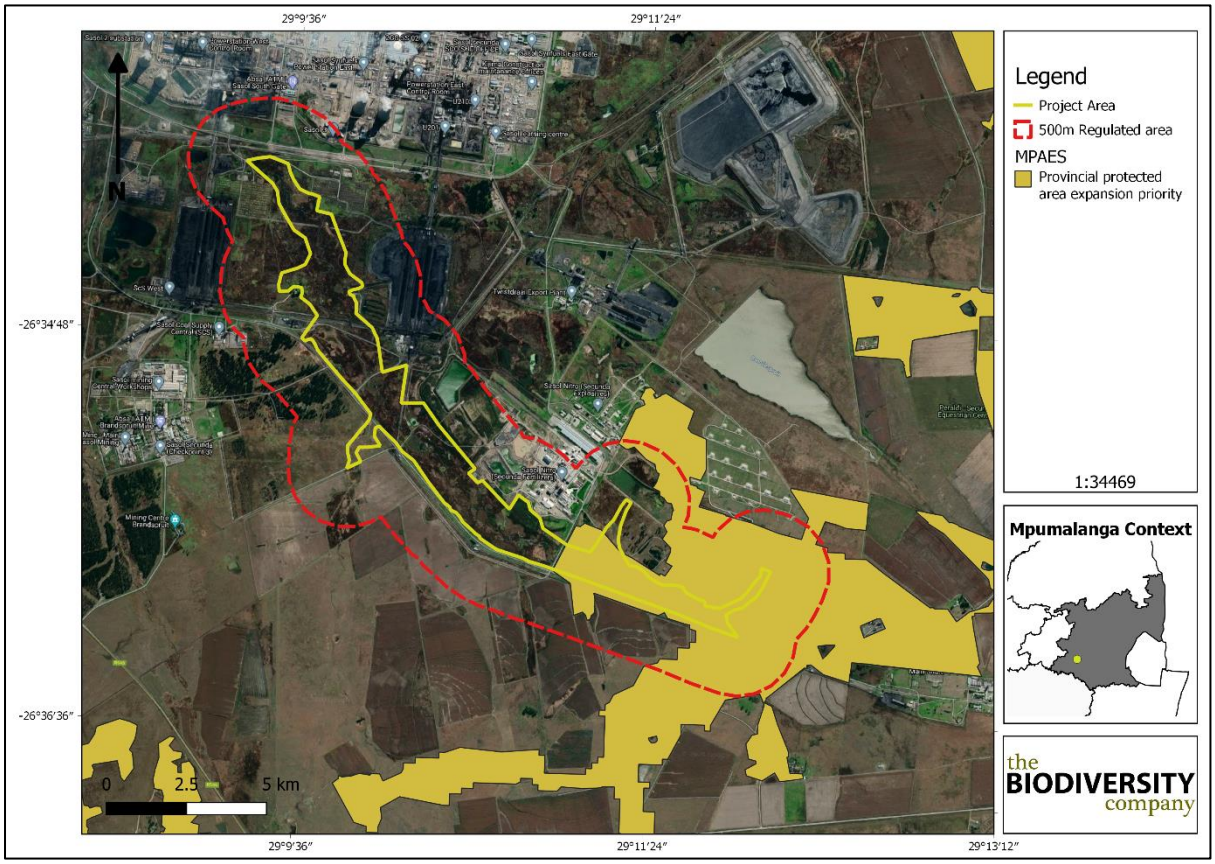


Figure 6-15: Project area in relation to the Mpumalanga Protected Areas Expansion Strategy areas

NATIONAL BIODIVERSITY ASSESSMENT

The National Biodiversity Assessment (NBA) was completed as a collaboration between the SANBI, the Department of Forestry Fisheries and Environment (DFFE) and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period (Skowno et al., 2019).

The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors (Skowno et al., 2019).

The two headline indicators assessed in the NBA are ecosystem threat status and ecosystem protection level

ECOSYSTEM THREAT STATUS

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Skowno et al., 2019).

Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Skowno et al., 2019).

The proposed project area was superimposed on the terrestrial ecosystem threat status **(Figure 6-16).** The project area falls across one ecosystem, which is listed VU.

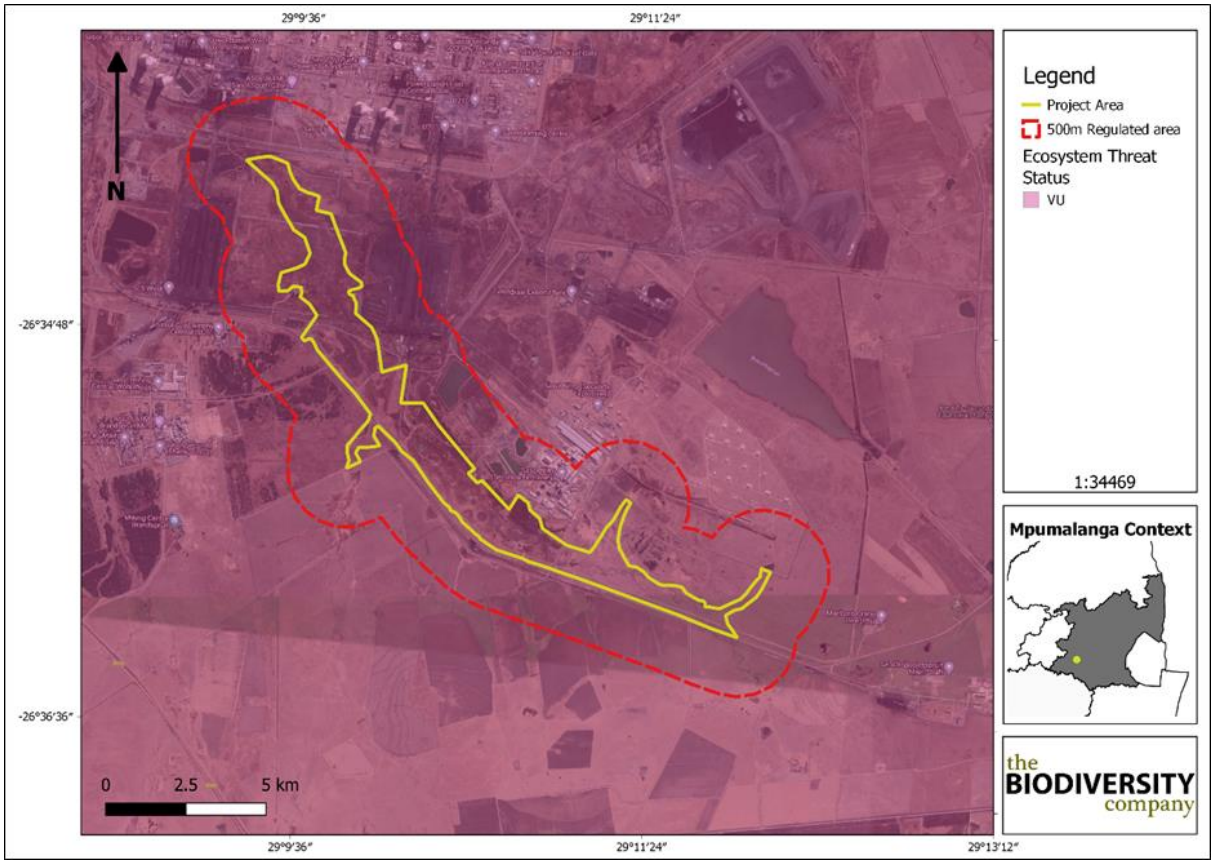


Figure 6-16: The project area showing the ecosystem threat status of the associated terrestrial ecosystems (NBA, 2018)

ECOSYSTEM PROTECTION LEVEL

Ecosystem protection level details whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as either not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno et al., 2019).

The project area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development **(Figure 6-17).** Based on this the terrestrial ecosystems associated with the proposed project area are rated as not protected. This means that these ecosystem types (and associated habitats) are not protected anywhere in the country (such as in nationally protected areas).

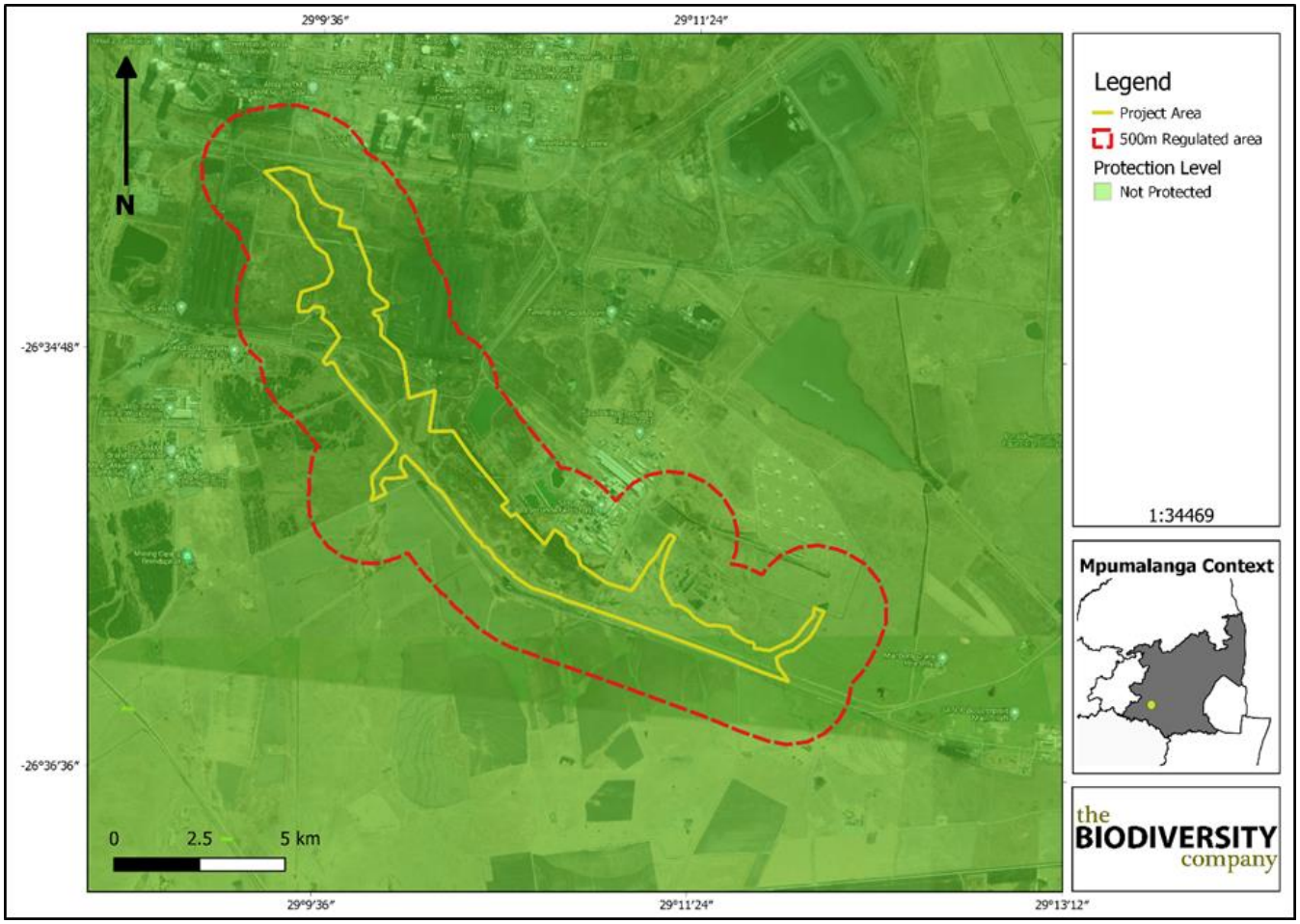


Figure 6-17: The project area showing the level of protection of terrestrial ecosystems (NBA, 2018)

FLORA

The site is situated in the Grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

VEGETATION TYPES

The Grassland biome comprises of many different vegetation types. The proposed project area falls entirely within the Soweto Highveld Grassland (Figure 9 1) vegetation type (SANBI, 2019) (**Figure 6-18**).

The Soweto Highveld Grassland vegetation type is found in Mpumalanga, Gauteng and to a little extent also in neighbouring Free State and North-West Provinces. This vegetation type typically comprises of an undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. Scattered small wetlands, narrow

stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover (Mucina & Rutherford, 2006).

According to Mucina and Rutherford (2006), the Soweto Highveld Grassland vegetation type is classified as Endangered. The national target for conservation protection for both these vegetation types is 24%, but only a few patches are statutorily conserved in Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, Rolfe's Pan Nature Reserves or privately conserved in Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves and the Heidelberg Natural Heritage Site.

By 2006 nearly half of the area of occupancy of this vegetation type had already been transformed by cultivation, urban sprawl, mining and building of road infrastructure. The amount of area transformed has most likely increased substantially. Some Soweto Grassland areas have been flooded by dams including Grootdraai, Leeukuil, Trichardtsfontein, Vaal and Willem Brummer.

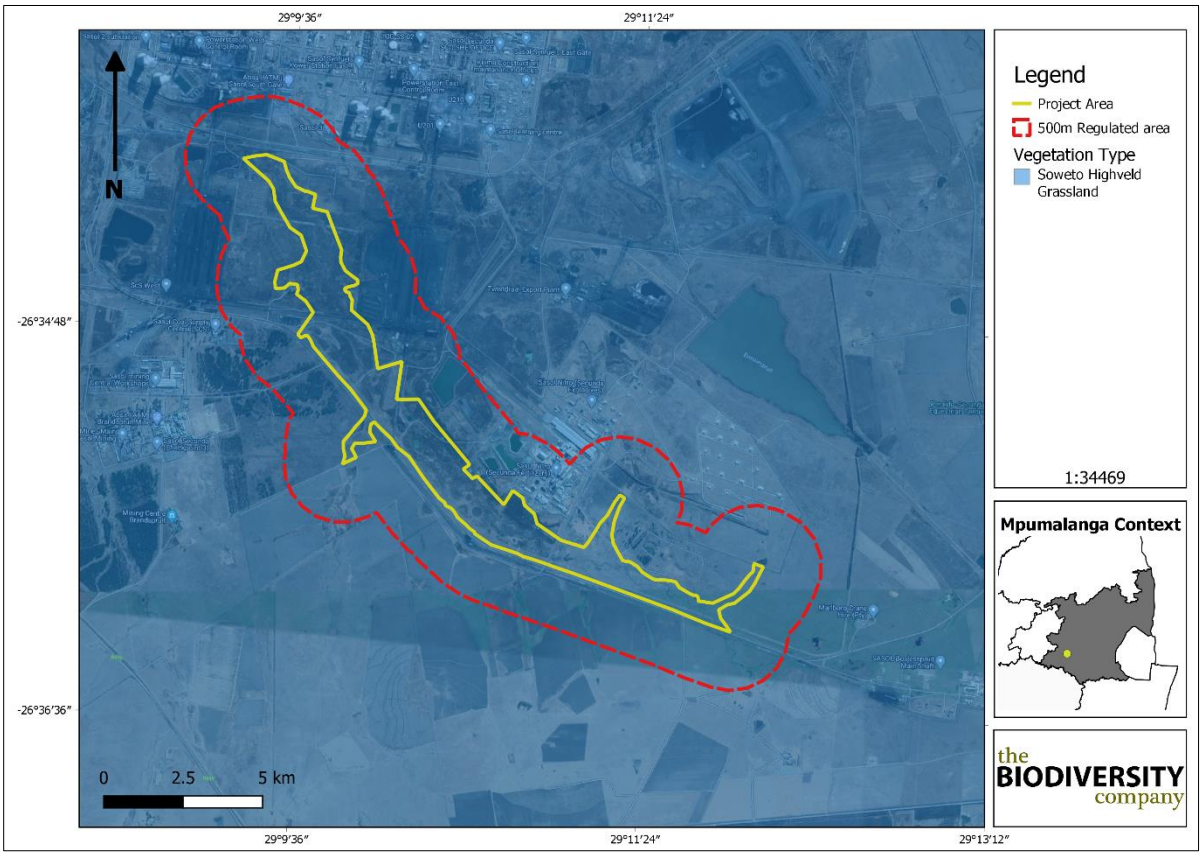


Figure 6-18: The project area showing the vegetation type based on the Vegetation Map of South Africa, Lesotho & Swaziland (BGIS, 2018)

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, 513 plant species are expected to occur within the project area and seven of the species are listed as being SCCs. A total of 38 tree, shrub and herbaceous plant species were recorded in the project area **(Table 6-6)** during the field assessment.

Table 6-6: Trees and shrubs in the project area

SCIENTIFIC NAME	COMMON NAMES	THREAT STATUS (SANBI, 2017)	SA ENDEMIC
Berkheya echinacea	Iphungula	LC	Indigenous, Not Endemic
Crinum bulbispermum	Orange river lily	LC-Protected in MP	Not Endemic
Cymbopogon caesius	Broad-leaved turpentine grass	LC	Not Endemic

SCIENTIFIC NAME	COMMON NAMES	THREAT STATUS (SANBI, 2017)	SA ENDEMIC
Cymbopogon nardus	Giant Turpentine Grass	LC	Not Endemic
Cynodon dactylon	Couch Grass, Quick Grass	LC	Not Endemic
Eragrostis chloromelas	Blue Love Grass	LC	Not Endemic
Eragrostis curvula	Weeping Love Grass	LC	Not Endemic
Gomphocarpus fruticosus subsp. fruticosus		LC	Not Endemic
Hyparrhenia hirta	Thatch Grass	LC	Not Endemic
Melinis repens	Natal Red Top	LC	Not Endemic
Paspalum dilatatum	Dallis Grass	LC	Indigenous
Persicaria lapathifolia	Pale Persicaria	NE	Not Endemic
Phragmites australis	Common Reed	LC	Not Endemic
Salix mucronata	African Willow	LC	Endemic
Setaria sphacelata var. sphacelata	Common Bristle Grass	LC	Not Endemic
Setaria verticillata	Bur Bristle Grass	LC	Not Endemic
Sporobolus africanus	Ratstail Dropseed; Rush Grass	LC	Not Endemic

PROTECTED SPECIES

One protected plant species (*Crinum bulbispermum*) was recorded within the project area **(Figure 6-19).** The plant is protected under the Mpumalanga Nature Conservation Act 10 of 1998: Schedule. According to the list of protected species under Schedule 11; no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected plant unless he or she is the holder of a permit which authorises him or her to do so.

Figure 6-19: *Crinum bulbispermum* observed within the wetland area

ALIEN VEGETATION

Ten (10) Category 1b invasive plant species **(Table 6-7)** were recorded within the project area during the field survey. These plants are listed under Category 1 and Category 2 of the NEMBA.

Table 6-7: Category 1b Invasive Plant Species

SCIENTIFIC NAME	COMMON NAMES	THREAT STATUS (SANBI, 2017)	SA ENDEMIC	ALIEN CATEGORY
Arundo donax	Spanish reed			NEMBA Category 1b.
Cirsium vulgare	Spear Thistle, Scotch Thistle			NEMBA Category 1b
Datura ferox	Large Thorn Apple			NEMBA Category 1b.
Datura stramonium	Jimsonweed			NEMBA Category 1b.
Eucalyptus camaldulensis	Red River Gum			NEMBA Category 1b
Flaveria bidentis	Smelter's-bush			NEMBA Category 1b.
Pennisetum clandestinum	Kikuyu Grass		Not Endemic	NEMBA Category 1b in protected areas and wetlands.
Robinia pseudoacacia	Black locust			NEMBA Category 1b.
Tamarix ramosissima	Pink tamarisk			NEMBA Category 1b.
Verbena bonariensis	Purple Top			NEMBA Category 1b.

FAUNA

AVIFAUNA

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 299 bird species are expected to occur in the vicinity of the project area. Of the expected bird species, Sixteen (16) species are listed as species of conservation concern (SCC) either on a regional scale or international scale. The SCC include the following:

- One (1) species that are listed as EN on a regional basis;
- Three (3) species that are listed as VU on a regional basis; and
- Ten (10) species that are listed as NT on a regional basis.

Nineteen (19) bird species were recorded in the project area during the June 2019 survey based on either direct observations, vocalisations, or the presence of visual tracks & signs (**Table 6-8**). The low number of species can be attributed to the rainy and cold weather during the day of the survey which limited activity.

Table 6-8: A list of avifaunal species recorded for the project area

SPECIES	COMMON NAME	CONSERVATION STATUS	
		REGIONAL (SANBI, 2016)	IUCN (2017)
Acridotheres tristis	Myna, Common	Unlisted	LC
Alopochen aegyptiacus	Goose, Egyptian	Unlisted	LC
Ardea melanocephala	Heron, Black-headed	Unlisted	LC
Ardea purpurea	Heron, Purple	Unlisted	LC
Columba livia	Dove, Rock	Unlisted	LC
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC
Estrilda astrild	Waxbill, Common	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Macronyx capensis	Longclaw, Cape	Unlisted	LC
Numida meleagris	Guineafowl, Helmeted	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Platalea alba	Spoonbill, African	Unlisted	LC
Ploceus capensis	Weaver, Cape	Unlisted	LC
Ploceus cucullatus	Weaver, Village	Unlisted	LC
Saxicola torquatus	Stonechat, African	Unlisted	LC
Streptopelia senegalensis	Dove, Laughing	Unlisted	LC
Struthio camelus	Ostrich, Common	Unlisted	LC
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC

MAMMALS

The IUCN Red List Spatial Data (IUCN, 2017) lists 81 mammal species that could be expected to occur within the vicinity of the project area. Of these species, 9 are medium to large conservation dependant species, such as *Ceratotherium simum* (Southern White Rhinoceros) and *Equus quagga* (Plains Zebra) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list.

Of the remaining 72 small to medium sized mammal species, fifteen (15) are listed as being of conservation concern on a regional or global basis. The list of potential species includes:

- Two (2) that is listed as EN on a regional basis;
- Five (5) that are listed as VU on a regional basis; and
- Eight (8) that are listed as NT on a regional scale.

During the assessment undertaken in June 2019, five mammal species **(Table 6-9)** were recorded based on direct observations and/or the presence of visual tracks & signs. The overall mammal diversity within the project area is thus considered to be good and has a high likelihood of supporting SCC, especially Serval.

Table 6-9: Recorded Mammal Species on site

SPECIES	COMMON NAME	CONSERVATION STATUS	
		Regional (SANBI, 2016)	IUCN (2017)
Atilax paludinosus	Water Mongoose	LC	LC
Canis mesomelas	Black-backed Jackal	LC	LC
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC
Sylvicapra grimmia	Common duiker	LC	LC

HERPETOFAUNA (REPTILES AND AMPHIBIANS)

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017) 36 reptile species are expected to occur in the project area. Two (2) reptile SCC are expected to be present in the project area namely *Crocodylus niloticus* (Nile Crocodile) and *Smaug giganteus* (Giant Dragon Lizard).

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the Amphibian Map database provided by the ADU (ADU, 2017) Twenty-two (22) amphibian species are expected to occur in the project area. No amphibian SCC are expected to occur in the project area according to the above-mentioned sources

During the June 2020 survey herpetofauna diversity measured too low with no species recorded within the project area. It is assumed that the lack of species observed could be attributed to the assessment being undertaken during the dry season. It is understood that in winter month's herpetofauna movement is lethargic/slow due to them being cold blooded species.

6.1.6 LAND USES AND ZONING

The area surrounding the proposed site has several uses such as industrial, residential, commercial and agricultural. The middle to high-income residential area of Secunda is located approximately 5 km north-east of site and includes a variety of commercial activities. The low cost housing development of eMbalenhle is located 10 km north-west of the site. Due to the highly industrialised nature of the area, there is extensive infrastructural development including an extensive road and rail network.

6.2 SOCIO-ECONOMIC ENVIRONMENT

6.2.1 AMBIENT AIR QUALITY

Ambient air quality in this region of South Africa is strongly influenced by regional atmospheric movements, together with local climatic and meteorological conditions. Mpumalanga Province experiences a wide range of both natural and anthropogenic sources of air pollution ranging from power generation to veld fires, mining activities, industrial processes, agriculture, paper and pulp processing, vehicle use and domestic use of fossil fuels. The Highveld was declared a priority area, referred to as the Highveld Priority Area (HPA), in terms of section 18(1) of the NEM: AQA. This indicates that the ambient air quality within the HPA exceeds or may exceed ambient air quality standards with respect to one or more air quality parameters.

The DFFE published the HPA Air Quality Management Plan in 2012 that identified that industrial activities were by far the largest contributor of emissions in the HPA, accounting for 89% of Particulate Matter 10 (PM10), 90% of NOx and 99% of SO2 (Department of Environmental Affairs, 2012). Secunda is categorized as one of the five HPA areas where ambient air quality is monitored.

The proposed wetland reinstatement project will have minimal impact on ambient air quality (dust generation) and thus does not require an Air Quality Impact Assessment.

6.2.2 AMBIENT NOISE

Due to the nature of the site being industrial, ambient noise levels are monitored on a quarterly basis. There may be minimal noise during construction as result of the contractor on site however; these are anticipated to be minimal and can be effectively mitigated and managed. The proposed development will not result in ambient noise impacts that are of environmental disruption as there are no sensitive noise receptors near or within the proposed development area.

6.2.3 HERITAGE AND CULTURAL RESOURCES

There are no sites of archaeological significance known in the project area. The site is mainly industrial and no extensive bulk earthworks are anticipated for the proposed project; thus, no impact is anticipated on cultural artefacts. However, it should be kept in mind that archaeological deposits generally occur below ground level. Should archaeological material be exposed during development activities, such activities should be halted, and a heritage authority and heritage specialist be notified in order for an investigation and evaluation.

The proposed wetland reinstatement project will have minimal to no impact on heritage resources and thus does not require a Heritage Impact Assessment.

6.2.4 SOCIO-ECONOMIC ENVIRONMENT

GERT SIBANDE DISTRICT MUNICIPALITY

Gert Sibande District Municipality is designated as DC30 as per the Municipal Demarcation Board, and is one of the three (3) District Municipalities that constitute Mpumalanga Province. The District Municipality is bordered by the Ekurhuleni Metropolitan Municipality and Sedibeng District Municipality to the west. Thabo Mofutsanyane District Municipality is located to the south-west. The Ehlanzeni District Municipality is located to the north-east and Nkangala District Municipality to the north. Amajuba and Zululand District Municipalities in KwaZulu-Natal Province are located to the south, and Swaziland to the east.

Gert Sibande District Municipality is the largest of the three Districts in Mpumalanga Province at 31 841 km², covering 40% of the Mpumalanga Province's land mass. The western portion of the District mostly comprises typical Highveld vegetation and climate, with the eastern end of the District being more mountainous and characterised by extensive forestry and rural settlements and villages in the east.

The concentration of conservation and protected areas also increases towards the east. Apart from the east-west orientated N17/N2 corridor running through the Gert Sibande District Municipality, there are also two main north-south routes running through the District: the N3 freeway to the west, and the N11 route running through the central part of the District.

The District comprises seven (7) constituent Local Municipalities as depicted **Table 6-10** and **Figure 6-20**.

Table 6-10: Gert Sibande District Municipality: Local Municipalities (Source: Municipal Demarcation Board)

NAME OF MUNICIPALITY	MAIN ADMIN LOCATION	AREA (KM²)
Chief Albert Luthuli	Carolina	5559
Dipaleseng	Balfour	2616
Lekwa	Standerton	4585
Msukaligwa	Ermelo	6017
Mkhondo	Piet Retief	4882
Dr. Pixley Isaka Ka Seme	Volksrust	5227
Govan Mbeki	Secunda	2955

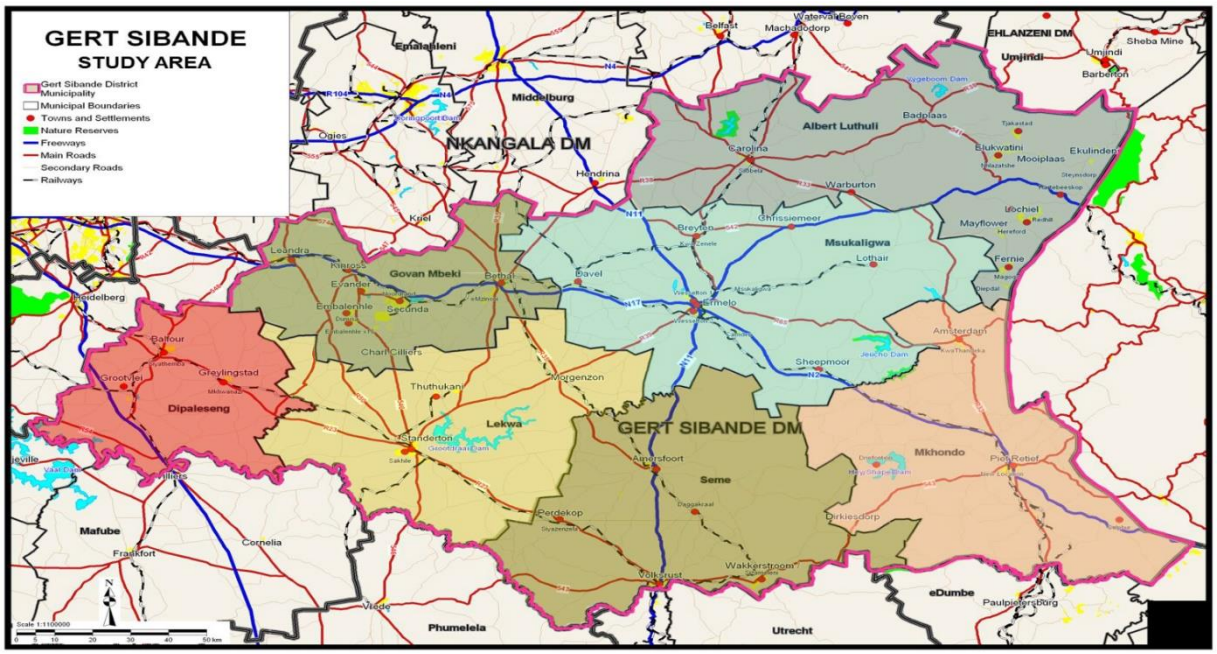


Figure 6-20: Gert Sibande District Municipality

GOVAN MBEKI LOCAL MUNICIPALITY

The Govan Mbeki Local Municipality is the smallest municipality within the Gert Sibande District, covering approximately 9% of its geographical area but has the largest population in the District of 480 000 people of which 52% is are male and 48% female (Community Survey, 2016). There are 108 892 households with an average household size of 3.3 people and a population growth rate of 3.1. In 2016, the population growth was 1.9% per annum with 65.8% of the population falling between the 15 to 64 age group (Statistics SA, 2016).

Govan Mbeki has the most diversified economy within the Gert Sibande District, dominated by the petrochemical industry (the SASOL II and III complexes) and coal and gold mining. The high population is the result of people migrating to the municipality seeking job opportunities as Govan Mbeki is considered one of the economical hub of Mpumalanga for job seekers. The high gender ratio towards males is also due to beneficial employment opportunities within manufacturing, industrial and mining companies.

The largest employing industries in Govan Mbeki community services, trade (including tourism), mining, manufacturing, finance and agriculture (**Figure 6-21**).

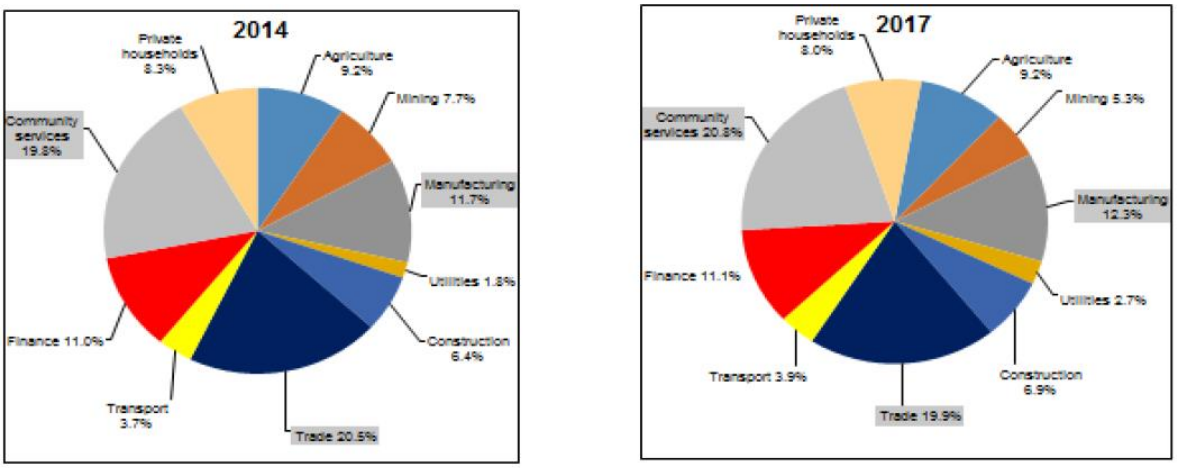


Figure 6-21: Employment by Industry in Govan Mbeki Local Municipality (Govan Mbeki IDP, 2019)

The unemployment rate of Govan Mbeki increased from 22.4% in 2013 to 23.3% in 2017. Govan Mbeki's unemployment rate was however, the 3rd lowest among all the municipal areas of Mpumalanga. Increase in employment level between 2014 and 2017, but at a slow rate. Only more or less 2 900 new employment opportunities per annum in the 3 year period. **Table 6-11** shows that the mining sector (39%) and manufacturing sector (24%) contributes the most in terms of GDP.

Table 6-11: Govan Mbeki's sector GDPR contributions, percentage shares of the economy (Source: Regional Economic Indicators, 2011)

ECONOMIC SECTOR	GDPR (RANDS)	% SHARE
Mining	10 574 495 600	39%
Manufacturing	6 590 891 943	24%
Wholesale and trade	4 168 093 454	15%
Government and community service	2 396 477 705	9%
Business services	1 338 062 167	5%
Transport	1 189 554 953	4%
Agriculture	367 050 120	1%
Construction	354 147 947	1%
Electricity and water	351 098 875	1%
Total:	**27 329 872 764**	**100%**

7 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social impacts associated with the proposed development. The assessment methodology is outlined in Section 4.4. The issues identified stem from those aspects presented in Chapter 6 of this document as well as project description provided. The impact assessment will be based on the preferred alternative at all project phases. This section only assesses the preferred option along with the no-go section. The mitigation hierarchy criteria for each mitigation measure is indicated in brackets after each measure indicated.

Furthermore, decommissioning assessment will be considered as part of the decommissioning process which will be subject to a separate authorisation and impact assessment process. Any decommissioning impacts will be assessed at this stage. The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326.

7.1 EXISTING IMPACTS

It is acknowledged that the VBC08 Wetland System is currently considered to be a moderately to seriously modified system. The following existing impacts are currently having a negative impact on the wetland system:

- Fencing;
- Anthropogenic activities in close proximity;
- Secondary roads and cleared areas;
- Invasive plant species;
- Water pollution;
- Sasol plant with associated air pollution; and
- Powerlines within the vicinity of the project area.

7.2 AIR QUALITY

7.2.1 CONSTRUCTION PHASE

DUST AND PARTICULATE MATTER

Air quality guidelines are provided by the ambient dust concentration limits prescribed by SANS 1929:2005. Whilst these guidelines are currently not enforceable they do serve as recommendations for good practice. SANS 1929:2005 sets out dust deposition rates, expressed in units of mg.m-2.day-1 over a typical 30-day averaging period.

During the construction phase, dust and vehicular emissions will be released as a result of excavations as well as earth moving machinery and trucks transporting construction material. The emissions will, however, have short term impacts and localised to site which can be easily mitigated and thus the authorisation of such emissions will not be required. All construction phase air quality impacts will be minimised with the implementation of dust control measures contained within the EMPr and the dust impacts will be short term in nature.

The impact of the construction phase on the generation of dust and particulate matter is shown in **Table 7-1.**

Table 7-1: Construction Impact on Generation of Dust and Particulate Matter

Potential Impact: Generation of Dust and PM	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	1	2	3	1	4	**28**	**Low**	(-)	High
With Mitigation	1	1	3	1	3	**18**	**Low**	(-)	High
Mitigation and Management Measures	– Wetland vegetation clearing should be kept minimum; – Early vegetation and stabilising of disturbed areas; – Implement dust suppression methods during construction to minimise dust emissions from the site activities; – Ensure that all vehicles and machines are adequately maintained to minimise emissions; – It is recommended that the clearing of wetland vegetation from the site should be selective and done just before construction so as to minimise erosion and dust; – All materials transported to site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials. – No burning of waste, such as plastic bags, cement bags and littering is not permitted; and – All issues/complaints must be recorded in the complaints register.								

7.2.2 OPERATIONAL PHASE

There are no air quality impacts anticipated during the operational phase of the VBC08 wetland reinstatement project.

7.2.3 DECOMMISSIONING PHASE

The impacts on air quality during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.3 NOISE EMISSIONS

7.3.1 CONSTRUCTION PHASE

Elevated noise levels are likely to be generated by the construction activities (machinery and vehicles) and the workforce. Due to the temporary and limited nature of the project activities, coupled with the fact that there is a limited number of noise receptors around the project area, the impacted is regarded as low. Acceptable levels are prescribed by SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and to Speech Communication) and can be used as guidelines. Noise impact measures are outlined in **Table 7-2** below.

Table 7-2: Construction Impact on Noise

Potential Impact: Ambient Noise	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	1	4	**28**	**Low**	(-)	High
With Mitigation	2	1	1	1	3	**15**	**Low**	(-)	High
Mitigation and Management Measures	— The equipment must be in good working order, within service dates, and inspected before use; — Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals; — Equipment with lower noise output must be selected where practical,								

7.3.2 OPERATIONAL PHASE

There are no anticipated noise impacts during the operational phase of VBC08 wetland reinstatement project. Maintenance of the weirs will require a small workforce (2-3) resulting in limited to no noise impacts.

7.3.3 DECOMMISSIONING PHASE

The impacts on ambient noise during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.4 SOILS

7.4.1 CONSTRUCTION PHASE

SOIL EROSION

During the construction phase, the installation of weirs could leave wetland soils exposed and susceptible to erosion. The removal vegetation and excavation can result in an increase in erosion down the Groot-Bossie Spruit. Measures should be implemented to manage stormwater and water flow on the site. If the stormwater and water flow is not regulated and managed onsite, it could cause significant erosion of wetland soils. The construction impact on soil erosion is indicated in Error! Reference source not found.**Table 7-3.**

Table 7-3: Construction Impact on Soil Erosion

Potential Impact: Soil Erosion	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	2	4	**32**	**Medium**	(-)	High
With Mitigation	1	2	1	2	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Where possible, consider conducting construction activities during winter where rainfall is minimal;								

	– Only the proposed demarcated wetland project area should be cleared of vegetation. This should be done in stages as construction works progress, if possible; – Implement stormwater management measures that will help to reduce the speed of the water. These measures must also assist with the prevention of water pollution, erosion and siltation; – Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching; – Any exposed earth should be rehabilitated promptly, and this could include planting suitable vegetation (vigorous indigenous grasses) that mimics the surrounding environment to protect the exposed soil; – If excavations or foundations fill up with stormwater, these areas should immediately be drained and measures to prevent access to these areas should be implemented; – Erosion control measures should be implemented during the construction phase on large exposed areas and where stormwater is temporarily channelled; – Progressive rehabilitation of disturbed land should be carried out to minimize the amount of time that bare soils are exposed to the erosive effects of rain and subsequent runoff; – Landscape the area so that there is a free flow of water, without being erosive, thus increasing the catchment area; and – Implementation of Landscape Management Plan included in the EMPr.

SOIL CONTAMINATION

During construction activities, construction vehicles/trucks/machinery as well as hazardous substances utilised on the site might spill and contaminate the soil. The impact of the construction phase on soil pollution is indicated in **Table 7-4** below.

Table 7-4: Construction Impact on Soil Contamination

Potential Impact: **Soil Contamination**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	3	3	4	**36**	**Medium**	(-)	High
With Mitigation	1	1	3	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	– All construction vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; – Plant and vehicles are to be repaired immediately upon developing leaks; – Drip trays shall be supplied for all idle vehicles and machinery; – No repair work may be undertaken on machinery onsite or campsite area; – Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants;								

	— Ensure appropriate handling of hazardous substances; — Keep spill kits onsite and train personnel to use them appropriately; — Fuels and chemicals must not be stored in adequate storage facilities that are secure, enclosed and bunded; and — Implement stormwater management measures that will help to reduce the speed of the water flows. These measures must also assist with the prevention of wider range of the site.

7.4.2 OPERATIONAL PHASE

IMPROVED WETLAND FUNCTIONALITY

The proposed re-instatement and development of the wetland would result in the improvement of the currently poor PES and EIS scores. The study site has been significantly modified by the current and past land use activities. The implementation of the weirs will result in an increase in the water level and therefore would increase the spatial extent of the permanent wetland zone. The impact of the operational phase on the improvement of wetland functionality is indicated in **Table 7-5** below

Table 7-5: Operational impact on Wetland Functionality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	1	4	**28**	**Low**	(+)	High
With Mitigation	4	2	3	4	4	**52**	**Medium**	(+)	High
Mitigation and Management Measures	— Conduct regular inspections of the structures, particularly after high rainfall events. All weak issues such as non-vegetated areas, erosion gullies forming etc must be addressed immediately; — Monitor water quality regularly to determine if the intended outcome is being achieved; — Monitor the prevalence of biodiversity diversity and abundances for the area.								

REDUCED SOIL EROSION

The rehabilitation (including the removal of alien vegetation) of the wetland will improve vegetation cover in the wetland which will protect the wetland from further scouring and deteriorating hence minimising soil erosion within wetland. The operational impacts on soils for the rehabilitated wetland system are outlined in **Table 7-6**.

Table 7-6: Operation impact on reduced soil erosion

Potential Impact: Soil Erosion	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	1	1	3	2	4	**28**	**Low**	(+)	High
With Mitigation	4	2	3	4		**52**	**Medium**	(+)	High

Mitigation and Management Measures	— Conduct regular inspections of the structures, particularly after high rainfall events. All weak issues such as non-vegetated areas, erosion gullies forming etc must be addressed immediately; — Monitor water quality regularly to determine if the intended outcome is being achieved; — Monitor the prevalence of biodiversity diversity and abundances for the area.

7.4.3 DECOMMISSIONING PHASE

The impacts on geology and soils during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.5 SURFACE WATER

A hydrology assessment was undertaken by WSP and is included as **Appendix D2.**

7.5.1 CONSTRUCTION PHASE

ALTERED FLOW REGIME

The placement of weirs will affect the natural flow velocity of the Groot-Bossie Spruit which may affect the downstream flow regime. The impact of the weir operation on flow regime is indicated **Table 7-7.**

Table 7-7: Operational Impact on Flow Regime

Potential Impact: **Flow Regime**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	3	3	4	3	**39**	**Medium**	(-)	High
With Mitigation	2	1	1	1	3	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Weirs must be designed to allow maintenance flow of the Groot-Bossie Spruit to pass through								

DETERIORATION IN WATER QUALITY FROM CONTAMINATION

The spillage of oils, fuel and chemicals from heavy machinery and trucks can result in hydrocarbon pollution of the surrounding water resources here is a potential to affect the surface water quality in the area due to construction activities. This is influenced by spills and leaks, the storage of chemicals, mixes and fuel, location and protection of stockpiles, onsite waste management and the management of stormwater. The construction impact on water quality is indicated in **Table 7-8.**

Table 7-8: Construction Impact on Water Quality from Contamination

Potential Impact: **Deterioration in Water Quality from Contamination**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**	**Character**	**Confidence**

Without Mitigation	3	2	3	3	3	**33**	**Medium**	(-)	High
With Mitigation	2	1	1	2	3	**18**	**Low**	(-)	High
Mitigation and Management Measures	– Construction areas should be demarcated and development limited to these boundaries; – Construction method statements are to be adhered to. These method statements should consider hydrological flow regimes, flora and fauna; – Stormwater channels and preferential flow paths should be delineated, filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion; – During construction, contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly; – A suitable stormwater management plan must for formulated for the project. The plan must ensure that clean and dirty water are separated, that only clean water is diverted into the wetlands (where required) and that the discharge of water will not result in scouring and erosion of the receiving systems; – The stormwater management plan should incorporate "soft" engineering measures as much as possible, limiting the use of artificial materials; – As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site; – Waste management must be a priority and all waste must be collected and stored effectively; – All chemicals and toxicants during construction and operation must be stored in bunded areas; – All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site; – All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping", as well as an understanding of environmental risks in their various areas of work; – Adequate sanitary facilities and ablutions on the site must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation); and – Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems. – The Contractor shall submit a Surface Water Management Plan by which any surface water, be it from rain, excavations or any other source, is controlled and led through settling and treatment ponds where necessary.								

INCREASED TURBIDITY

The construction phase has the potential to increase sediment laden surface water / stormwater contamination has the potential to lead to the deterioration of downstream water quality due to increased turbidity of surface water. The construction impact on water quality is indicated in **Table 7-9.**

Table 7-9: Construction impact will increase turbidity

Potential Impact: Increased Turbidity	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation		1	3	2	4	**32**	**Medium**	(-)	High
With Mitigation	1	1	1	2	3	**15**	**Low**	(-)	High
Mitigation and Management Measures	– Where possible, consider conducting construction activities during winter where rainfall is minimal; – Only the proposed demarcated wetland project area should be cleared of vegetation. This should be done in stages as construction works progress, if possible; – Implement stormwater management measures that will help to reduce the speed of the water. These measures must also assist with the prevention of water pollution, erosion and siltation; – Any exposed earth should be rehabilitated promptly, and this could include planting suitable vegetation (vigorous indigenous grasses) that mimics the surrounding environment to protect the exposed soil; – If excavations or foundations fill up with stormwater, these areas should immediately be drained and measures to prevent access to these areas should be implemented; – Erosion control measures should be implemented during the construction phase on large exposed areas and where stormwater is temporarily channelled; and								

7.5.2 OPERATIONAL PHASE

IMPROVEMENT OF WATER QUALITY

Wetlands play a vital role by removing toxic substances and sediment from water, while also improving downstream water quality and the overall health of communities. Adjacent ecosystems, particularly those downstream of the proposed rehabilitation measures, will be directly affected by the proposed rehabilitation measures. These include the Groot Bossiespruit riparian system, as well as the associated channelled valley bottom wetland HGM which continues downstream. The impact of the weir operation on water quality is indicated in **Table 7-10.**

Table 7-10: Operational impacts on water quality

Potential Impact: Improvement of Water Quality	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	2	3	4	**40**	**Medium**	(+)	High
With Mitigation	4	3	3	4	4	**56**	**Medium**	(+)	High
Mitigation and Management Measures	– Weirs must be designed to allow maintenance flow of the Groot-Bossie Spruit to pass through								

7.5.3 DECOMMISSIONING PHASE

The impacts on surface water resources during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.6 GROUND WATER RESOURCES

DETERIORATION IN GROUNDWATER QUALITY

There is a potential to affect the groundwater quality in the area. This is influenced by spills and leaks, the storage of chemicals, mixes and fuel. Any contaminants that are not cleaned from the ground will seep into underground water resources. The impact of construction on change in water quality is shown in **Table 7-11.**

Table 7-11: Construction Impact on Deterioration in Groundwater Quality

Potential Impact: Deterioration in Water Quality	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	3	3	**33**	**Low**	(-)	High
With Mitigation	2	1	1	2	3	**18**	**Low**	(-)	High
Mitigation and Management Measures	– Construction areas should be demarcated, and wetland areas marked as "restricted" in order to prevent the unnecessary impact to and loss of these systems; – Laydown yards, camps and storage areas must be beyond the wetland areas where applicable; – Stormwater channels and preferential flow paths should be delineated, filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion; – During construction contractors used for the project must have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly; – A suitable storm water management plan must for formulated for the project. The plan must ensure that clean and dirty water are separated, that only clean water is diverted into the wetlands (where required) and that the discharge of water will not result in scouring and erosion of the receiving systems; – The stormwater management plan should incorporate "soft" engineering measures as much as possible, limiting the use of artificial materials; – As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site; – All chemicals and toxicants during construction and operation must be stored in bunded areas; – All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site; – All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping";								

	— Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation); and — Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems.

7.6.1 OPERATIONAL PHASE

INCREASE IN GROUNDWATER LEVELS

The operational phase activities of the re-instatement will ensure that soils are predominantly saturated during the wet period. The inundation of the wetland area will increase the groundwater quantity recharging the system and surface water bodies. The impact of operations on ground water quantity is shown in **Table 7-12.**

Table 7-12: Operation increase in Groundwater Levels

Potential Impact: Increase in Groundwater	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	2	3	4	**40**	**Medium**	(+)	High
With Mitigation	4	3	3	4	4	**56**	**Medium**	(+)	High
Mitigation and Management Measures	— Conduct regular inspections of the structures, particularly after high rainfall events. All weak issues such as non-vegetated areas, erosion gullies forming etc must be addressed immediately; — Monitor water quality regularly to determine if the intended outcome is being achieved; — Monitor the prevalence of biodiversity diversity and abundances for the area.								

7.6.2 DECOMMISSIONING PHASE

The impacts on groundwater resources during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.7 BIODIVERSITY

A biodiversity impact assessment was undertaken by The Biodiversity Company and is included as **Appendix D1.**

7.7.1 CONSTRUCTION PHASE

TEMPORARY DISTURBANCE OF WILDLIFE

The pre-construction phase activities are considered a low risk as they typically involve desktop assessments and initial site inspections. The site comprises areas that has already been altered. This phase of the assessment would include, amongst others, site visits of various contractors, environmental and social impact assessment and compiling of management plans.

Only one minor impact was assessed regarding the planning phase specifically the temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles. This impact is also considered relevant to the construction phase.

The impact of the planning and construction phase on the temporary disturbance of wildlife is indicated in **Table 7-13.**

Table 7-13: Construction Impact on the Temporary Disturbance of Wildlife

Potential Impact: Temporary Disturbance of Wildlife	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	2	3	**33**	**Medium**	(-)	High
With Mitigation	2	2	1	1	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— Begin construction of the structures furthest down the system, working up the catchment; — Restrict all construction related activities to the structure footprint area; — Access construction areas by means of the shorted or least intrusive route through the wetland. Prioritize existing routes where possible; — Adhere to the prescribed wetland buffers. Restrict all non-essential activities (e.g. cement mixing and equipment wetland machinery storage) to outside of wetlands and their prescribed buffers; — Demarcate the 10 m construction area as well as the prescribed m buffer on the ground (e.g. pained wooden poles); — Construct as far as possible during winter when flow volumes are lowest. This will reduce impacts to wetlands due to soil poaching and vegetation trampling under peak saturation levels. Additionally, the risk of vehicles getting stuck and further degrading the vegetation integrity is lowest during this time.								

LOSS AND FRAGMENTATION OF FLORA

The construction phase involves the clearance of wetland vegetation which leads to further loss and fragmentation of the vegetation community. Vegetation clearance will result in displacement, direct mortalities and disturbance of faunal community (including potential threatened species) due to habitat loss and disturbances (such as site clearance, dust, vibrations, poaching and noise). The impact of the construction phase on loss and fragmentation of flora is indicated in **Table 7-14.**

Table 7-14: Construction Impact on Loss and Fragmentation of Flora

Potential Impact: Loss and Fragmentation of wetland vegetation community	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	4	4	4	**52**	**Medium**	(-)	High
With Mitigation	2	1	2	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— Reduce loss and fragmentation of vegetation community (listed as Vulnerable) within and adjacent to the project site, by keeping construction works within a limited footprint;								

Potential Impact: Loss and Fragmentation of wetland vegetation community	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	– Prevent the loss of species of conservation concern which are known to occur within the project area, by relocating them if they are identified; – Begin construction of the structures furthest down the system, working up the catchment; – Restrict all construction related activities to the structure footprint area; – Access construction areas by means of the shorted or least intrusive route through the wetland. Prioritize existing routes where possible; – Adhere to the prescribed wetland buffers. Restrict all non-essential activities (e.g. cement mixing and equipment wetland machinery storage) to outside of wetlands and their prescribed buffers; – Demarcate the 10 m construction area as well as the prescribed m buffer on the ground (e.g. pained wooden poles); – Construct as far as possible during winter when flow volumes are lowest. This will reduce impacts to wetlands due to soil poaching and vegetation trampling under peak saturation levels. Additionally, the risk of vehicles getting stuck and further degrading the vegetation integrity is lowest during this time. – Apply for a permit to destroy protected plant species or relocate the species in situ as necessary per rehabilitation structure. Plants can be collected from the construction area and transplanted into bags that should be housed in a nursery onsite or nearby. Removal of the bulb and intact root system as far as possible and then kept in moistened clear plastic bags until they can be replanted. – No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected plant unless he or she is the holder of a permit which authorises him or her to do so								

INCREASE IN ALIEN VEGETATION

Construction activities have the potential to wetland degradation and an increase in alien invasive species within the project area. There is a potential for a spread and/or establishment of alien and/or invasive species, especially in areas that are cleared as it is brought to the project area via site personnel and trucks. These are brought by site personnel on their clothing or via the truck tyres or as a result of pioneer species following a construction activity. The construction impact on increase in alien species in the area is shown in **Table 7-15.**

Table 7-15: Construction Impact on Increase in Alien Vegetation Species

Potential Impact: Increase in Alien Vegetation Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	4	4	**56**	**Medium**	(-)	High

Potential Impact: Increase in Alien Vegetation Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
With Mitigation	2	1	2	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— A vegetation alien invasive management plan should be implemented. This plan must be implemented during the construction phase of the project; — The presence of *Crinum bulbispermum* (and other SCC) must be determined for each construction site and the necessary action taken for the removal / relocation of these species; and — The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas — Limiting the construction area to the defined project areas and only impacting those areas where it is unavoidable to do so otherwise; — The use of herbicides is not recommended in or near wetlands (opt for mechanical removal); — Appropriately stockpile topsoil cleared from the project area. This can be used for rehabilitation of the intervention areas. — Minimize unnecessary clearing of vegetation; — Landscape and re-vegetate all denuded areas as soon as possible. — Compilation of and implementation of an alien vegetation management plan for the entire site, including the surrounding project area; and — Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site — A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs								

DISPLACEMENT OF FAUNA AND LOSS OF HABITAT

The construction activities will lead to the displacement, direct mortalities and disturbance of faunal community (including potential threatened species) due to habitat loss and disturbances (such as site clearance, dust, vibrations, poaching and noise). The construction impact on displacement of fauna is indicated in **Table 7-16** below.

Table 7-16: Construction Impact on Displacement of Fauna and Loss of Habitat

Potential Impact: Displacement of Fauna and Loss of Habitat	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	4	4	**52**	**Medium**	(-)	High
With Mitigation	2	1	2	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— Prevent the loss of species of conservation concern which are known to occur within the project area;								

Potential Impact: Displacement of Fauna and Loss of Habitat	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	— Limiting the construction area to the defined project areas and only impacting those areas where it is unavoidable to do so otherwise; — Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited; — Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas such as the wetland. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible. — The areas outside the defined project area, should be declared a 'no-go' areas during the construction phase and operational phase and all efforts must be made to prevent access to this area from construction workers and machinery. — All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.							

7.7.2 OPERATIONAL PHASE

CONTINUED HABITAT DEGRADATION.

There is a continued displacement, direct mortalities and disturbance of faunal community due to habitat loss and disturbances (such as dust and noise mainly through the maintenance of the system) during the operational phase. The operational impact on continued degradation is indicated in **Table 7-17**.

Table 7-17: Operational Impact on Continued Habitat Degradation

Potential Impact: Continued Habitat Degradation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	4	4	**52**	**Medium**	(-)	High
With Mitigation	2	1	1	2	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Reduce loss and fragmentation of vegetation community (listed as Vulnerable) within and adjacent to the wetland area; and								

Potential Impact: Continued Habitat Degradation	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
	— Prevent the loss of species of conservation concern which are known to occur within the project area, by relocating them if they are identified.								

CONTINUED DISPLACEMENT OF FAUNA AND LOSS OF HABITAT

There is continual displacement, direct mortalities and disturbance of faunal community due to habitat loss and disturbances (such as dust and noise). The operational impacts on continued displacement of fauna is indicated in **Table 7-18.**

Table 7-18: Operational Impact on continued Displacement of Fauna

Potential Impact: Displacement of Fauna	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	3	3	4	3	**39**	**Medium**	(-)	High
With Mitigation	2	1	2	1	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— Prevent the loss of species of conservation concern which are known to occur within the project area; — Limiting the construction area to the defined project areas and only impacting those areas where it is unavoidable to do so otherwise; — Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited; — The areas outside the defined project area, should be declared a 'no-go' areas during operational phase and all efforts must be made to prevent access to this area from construction workers and machinery; and — All snakes encountered must be reported so that they are taken away through the existing snake catching program.								

CONTINUED ALIEN VEGETATION ENCROACHMENT

There will be continued alien vegetation encroachment during the operational phase of the wetland re-instatement infrastructure as a result of displacement of fauna. The continued alien encroachment impacts are indicated **Table 7-19.**

Table 7-19: Operational Impact on Continued Alien Encroachment

Potential Impact: Increase in Alien Vegetation Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	4	4	**56**	**Medium**	(-)	High

Potential Impact: Increase in Alien Vegetation Species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
With Mitigation	2	1	2	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— Compilation of and implementation of an alien vegetation management plan. — Areas that are exposed to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species. — A rehabilitation plan needs to be implemented per intervention structure. A vegetation alien invasive management plan should be implemented. This plan must be implemented during project lifecycle of the project.								

RECOVERY OF VEGETATION COMMUNITY AND REDUCTION OF ALIEN INVASIVE PLANT SPECIES

There will be recovery of vegetation community and reduction of alien invasive plant species with the operational phase of the wetland re-instatement project. The operational impact on the recovery of vegetation is outlined in **Table 7-20**.

Table 7-20: Operational impact on Vegetation Recovery

Potential Impact: Vegetation Community Recovery	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	3	3	4	4	**18**	**Low**	(+)	High
With Mitigation	4	3	4	4	4	**60**	**Medium**	(+)	High
Mitigation and Management Measures	— Compilation of and implementation of an alien vegetation management plan. — Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. — Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible.								

PRESERVATION OF FAUNAL COMMUNITIES

The operational phase will result in the preservation and return of faunal communities due to habitat recovery and improvement. The operational impact of the preservation of faunal communities is outlined in **Table 7-21.**

Table 7-21: Operational impact on the preservation of Faunal Communities

Potential Impact: Preservation of Fauna	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	2	2	**16**	**Low**	(+)	High
With Mitigation	2	1	3	2	2	**14**	**Low**	(+)	High
Mitigation and Management Measures	— Compilation of and implementation of an alien vegetation management plan. — Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. — When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery.								

7.7.3 DECOMMISSIONING PHASE

The impacts on biodiversity during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.8 SOCIO-ECONOMIC ENVIRONMENT

7.8.1 CONSTRUCTION PHASE

EMPLOYMENT OPPORTUNITIES

The construction phase will result in the generation of temporary employment opportunities. Potential jobs include building contractors and labourers (semi-skilled and unskilled workers). Additional employment opportunities during the construction phase will be required. It is not envisaged that additional job opportunities will be required during the operation phase.

The impact assessment of the above-mentioned impacts is outlined in **Table 7-22.**

Table 7-22: Construction Impact on Employment Opportunities

Potential Impact: Employment Opportunities	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	1	3	**24**	**Low**	(+)	High
With Mitigation	2	2	3	2	3	**36**	**Medium**	(+)	High
Mitigation and Management Measures	— The project must aim to use local labour in order to benefit the local community, where possible and applicable for the project; and — Consult with local communities to boost local business.								

7.8.2 OPERATIONAL PHASE

The operational phase employment opportunities' impacts are expected to be limited to the site. No direct employment will be generated during the operational phase because the proposed structures will be located within the wetland. Maintenance activities may be undertaken by Sasol employees.

7.8.3 DECOMMISSIONING PHASE

The impacts on the social environment during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.9 TRAFFIC

7.9.1 CONSTRUCTION PHASE

The impact of additional traffic during construction is expected to be minimal and short term. The proposed site is directly adjacent to the local regional road. During the site visit, it was observed that there is limited movement of vehicles on this road which means the intermittent movement of trucks delivering construction supplies will have a low impact. The construction impact on traffic is indicated in **Table 7-23.**

Table 7-23: Construction Impact on Increased Local Traffic

Potential Impact: **Increased Local Traffic**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	3	1	4	**28**	**Low**	(-)	High
With Mitigation	2	1	1	1	3	**15**	**Low**	(-)	High
Mitigation and Management Measures	— Ensure deliveries are done as and when required; — The road network which surrounds the proposed development will have to be correctly maintained in order to support additional movement of vehicles. Transport should be limited to non-peak hours; — All site vehicles must limit the idle time on the access road.								

7.9.2 OPERATIONAL PHASE

There are no traffic related impacts anticipated during the operational phase of the VBC08 wetland re-instatement infrastructure.

7.9.3 DECOMMISSIONING PHASE

The traffic related impacts during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.10 HEALTH AND SAFETY

7.10.1 CONSTRUCTION PHASE

During construction, the employees are exposed to health and safety hazards from the mechanical machines and equipment used on the site. The construction impact on health and safety is indicated in **Table 7-24.**

Table 7-24: Construction Impact on Employee Health and Safety

Potential Impact: Employee Health and Safety	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	4	4	**52**	**Medium**	(-)	High
With Mitigation	2	1	3	4	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. — Provide suitable personal protective equipment (PPE); — Conduct site and safety induction to raise awareness of the risks associated with the site; — Conduct regular toolbox talks as refreshers to improve health and safety; — Develop safe work instruction method statements that should be used by employees in completing their tasks; — Train all relevant personnel on handling, use and storage of hazardous substances; — Provide MSDS for all hazardous substances kept onsite; and								

7.10.2 OPERATIONAL PHASE

There are no health and safety impacts anticipated during the operational phase of the VBC08 wetland re-instatement infrastructure.

7.10.3 DECOMMISSIONING PHASE

The health and safety related impacts during the decommissioning phase are anticipated to be similar to the construction phase impacts.

7.11 HERITAGE

7.11.1 CONSTRUCTION PHASE

There is no evidence of significant, formal or general protected heritage resources on or near the VBC08 wetland system. It is considered unlikely that the scale and nature of the project will impact on any heritage resources.

Construction activities should be conducted carefully and all activities ceased if any archaeological, cultural and heritage resources are discovered. The potential for any heritage and palaeontological impacts is indicated in **Table 7-25.**

Table 7-25: Construction Impact on Damage to Heritage Resources

Potential Impact: Damage to Heritage and Palaeontological Resources	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	5	2	**22**	**Low**	(-)	High
With Mitigation	1	1	3	1	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct site excavations within wetland carefully to avoid damaging any potential heritage resources; and — If any heritage resources are discovered, the SAHRA should be notified and investigation conducted before any activities can commence.								

7.11.2 OPERATIONAL PHASE

There are no anticipated heritage impacts associated with the operational phase as any existing resources would have been discovered during excavations and other intrusive construction activities.

7.11.3 DECOMMISSIONING PHASE

There are no anticipated heritage impacts associated with the decommissioning phase as any existing resources would have been discovered during excavations and other intrusive construction activities.

7.12 CUMULATIVE IMPACTS

VISUAL AND AESTHETICS

The current vegetation community of VBC08 wetland system is dominated by dense stands of weed species. The wetland re-instatement will remove alien vegetation and introduce natural biodiversity and indigenous vegetation communities. Improvement of the system will increase the species diversity improving the visual and aesthetics of the system.

CARBON SEQUESTRATION

The rehabilitation of the VBC08 wetland system is regarded as a positive impact. Wetlands are carbon-sequestering systems hence can store excess carbon from the atmosphere which is a contributor to climate change. The restoration and rehabilitation of the wetland system will enhance the health of the VBC08 wetland system and improve the ecosystems ability to adapt to climate change impacts in the long run.

WETLAND INTEGRITY

The enhancement of VCB08 wetland systems health by the removal of invasive alien plant species and the restoration of incised channels will improve the diversity within the system. These improvements will increase the ecological importance and sensitivity levels and will contribute to increased wetland biodiversity and overall integrity.

CHANGE IN HYDROGEOLOGICAL CONDITIONS

The re-instatement and rehabilitation of the VCB08 wetland system has the potential to improve on the groundwater levels. The flow paths of these soils are primarily overland flow, as these soils are predominantly saturated during the wet period. The inundation of the wetland area will increase the groundwater levels recharging the system and surface water bodies.

7.13 NO-GO ALTERNATIVE

Should the no-go alternative be adopted, the status quo will remain. Furthermore, rehabilitation of the wetland will not be carried out hence, continuation of scouring and deterioration of overall system to a possible health category F. There would be no reduction of contaminants (anaerobic processes) including inorganic matter, organic matter, toxic compounds and metals being discharged into the nearby rivers if the no-go alternative is considered

The no-go alternative will not attenuate any incidental spills from the Nitro Fertiliser Plant and these would be directly released into the Groot Bossiespruit impacting on downstream water quality and biodiversity impacts. The overall functionality of the system will deteriorate and increasing waste loads and nitrate concentrations within the system.

8 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that "development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…" NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA's preventative principle, potentially negative impacts on the environment and on people's environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of "reasonable measures".

In assessing the environmental feasibility of the proposed Wetland (VBC08) reinstatement, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented in order to minimise potentially significant impacts associated with the project, has been informed by best practice principles and the relevant legislation (where applicable).

The conclusions of this BA are the result of comprehensive assessments. These assessments were based on issues identified through the BA process and the parallel process of public participation that will be conducted when submitting for public review. The public consultation process will be undertaken according to the requirements of NEMA and every effort was made to include representatives of all stakeholders within the process.

8.1 ENVIRONMENTAL SENSITIVITIES

The following environmental sensitivities were identified on the site and will require specific applications or measures for mitigation to minimise impact. The proposed project site is located in the following sensitivities:

- In terms of the MBSP Terrestrial CBA map, the project area overlaps with:
  - Critical Biodiversity Area (CBA);
  - Other Natural Area (ONA); and
  - Moderately or Heavily Modified Areas (MMA's or HMA's).
- According to Mucina and Rutherford (2006), the Soweto Highveld Grassland vegetation type is classified as Endangered.
- Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, 513 plant species are expected to occur in the project area.
- One protected plant species (*Crinum bulbispermum*) was recorded within the project area **(Table 6-6).** The plant is protected under the Mpumalanga Nature Conservation Act 10 of 1998: Schedule 11which consist of a list of protected species.
- Findings of the assessment undertaken as part of the BA application indicate that nineteen (19) bird species were recorded in the project area during the June 2019 survey based on either direct observations, vocalisations, or the presence of visual tracks & signs **(Appendix D1).** Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 299 bird species are expected to occur in the vicinity of the project area, of the expected bird species, Sixteen (16) species are listed as SCC either on a regional scale or international scale. The SCC include the following:
  - One (1) species that are listed as EN on a regional basis;
  - Three (3) species that are listed as VU on a regional basis; and
  - Ten (10) species that are listed as NT on a regional basis.
- The IUCN Red List Spatial Data (IUCN, 2017) lists 81 mammal species that could be expected to occur within the vicinity of the project area. Of these species, 9 are medium to large conservation dependant species, such as *Ceratotherium simum* (Southern White Rhinoceros) and *Equus quagga* (Plains Zebra) that,

in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list.

- Of the remaining 72 small to medium sized mammal species, fifteen (15) are listed as being of conservation concern on a regional or global basis. The list of potential species includes:
  - Two (2) that is listed as EN on a regional basis;
  - Five (5) that are listed as VU on a regional basis; and
  - Eight (8) that are listed as NT on a regional scale.
- During the assessment undertaken in June 2019, five mammal species were recorded based on direct observations and/or the presence of visual tracks & signs. The overall mammal diversity within the project area is thus considered to be good and has a high likelihood of supporting SCC.

8.2 SPECIALIST CONCLUSIONS

8.2.1 WETLAND ASSESSMENT

It is evident from the assessment that a variety of low impacts (post-mitigation) have been identified for the project, but this is expected owing to the fact that the proposed structures will be located within the wetland, at 18 locations. A high positive impact is expected for the proposed structures, achieving the intended outcomes of improved water quality, attenuation and also the support of biodiversity for the area.

8.2.2 BIODIVERSITY ASSESSMENT

The survey, which was completed, and the corresponding studies resulted in good site coverage, assessing the major habitats and ecosystems, obtaining a general species (fauna and flora) overview and observing the major current impacts.

It is clear from the regional ecological overview, as well as the baseline data collected to date that much of the project area has been altered, both historically and at present due to the surrounding land use and the mismanagement of the wetland area. Even though somewhat degraded, the ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and as important habitat for various fauna and flora. The rehabilitation of this system is the most important aspect to consider for the proposed development.

The construction phase of the project is expected to be associated with a variety of negative risks which are necessary to achieve the net-positive “risks” expected for the operational phase of the project. A high positive risk is expected for the proposed structures, achieving the intended outcomes of improved water quality, attenuation and also the support of biodiversity for the area. Further, taking into consideration the predominantly seriously modified status of the system, the overall cumulative risks expected for the project is low. This is attributed to the fact that the integrity and functioning of the system is expected to improve over time.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the terrestrial ecology is expected to be low, whereas due to the nature of the project, the activities may lead to an overall positive impact if done correctly. Similarly, for the wetlands, despite a number of moderate risks being identified for the construction phase of the project, a net-positive high risk is expected for the operational phase of the project. Due to the identified moderate risks for this project, a WUL will be required. It is thus the opinion of the specialists that the project can proceed, and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

8.2.3 HYDRO-PEDOLOGICAL STUDY

The hydropological soil types within the study area are primarily dependent on the topography. Katspruit and Bonheim soil forms were identified on the midslopes, where they are classified as interflow soils. The soils that occupy the valley-bottom of the hillslope profile are the Rensburg soil form. These soil forms are shrink-swell

soils, which have a high clay percentage. The flow paths of these soils are primarily overland flow, as these soils are predominantly saturated during the wet period.

8.2.4 HERITAGE ASSESSMENT

The development of the proposed project will be below thresholds contained in section 38(1) of the NHRA. A review of heritage reports in the immediate area have yielded no evidence of significant, formal or general protected heritage resources. It is considered unlikely that the scale and nature of the project will impact on any heritage resources. No further heritage assessments are therefore recommended, provided that the chance finds procedure included in the EMPr is complied with.

8.3 IMPACT SUMMARY

A summary of all identified impacts and corresponding significance ratings for the proposed VBC08 wetland re-instatement project is outlined in **Table 8-1**.

Table 8-1: Impact Summary

NO	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
AQ1	Generation of Dust and PM	Construction	**Low**	-	**Low**	-
N1	Ambient Noise	Construction	**Low**	-	**Low**	-
S1	Soil Erosion	Construction	**Medium**	-	**Low**	-
S2	Soil Contamination	Construction	**Medium**	-	**Low**	-
S3	Improved wetland functionality	Operation	**Low**	+	**Medium**	+
S4	Reduced Soil Erosion	Operation	**Low**	+	**Medium**	+
SW1	Altered Flow Regime	Construction	**Medium**	-	**Low**	-
SW2	Deterioration in Water Quality from contamination	Construction	**Medium**	-	**Low**	-
SW3	Increased Turbidity	Construction	**Medium**	-	**Low**	-
SW4	Improvement of water quality	Operation	**Medium**	+	**Medium**	+
GW1	Deterioration of Groundwater Quality	Construction	**Low**	-	**Low**	-
GW2	Increased Gorundwater Levels	Operation	**Medium**	+	**Medium**	+

NO	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
B1	Temporary Disturbance on wildlife	Construction	**Medium**	-	**Low**	-
B2	Loss and fragmentation of flora	Construction	**Medium**	-	**Low**	-
B3	Increase in Alien Vegetation	Construction	**Medium**	-	**Low**	-
B4	Displacement of fauna and loss of habitat	Construction	**Medium**	-	**Low**	-
B5	Continued habitat degradation	Operation	**Medium**	-	**Low**	-
B6	Continued displacement of fauna and loss of habitat	Operation	**Medium**	-	**Low**	-
B7	Continued alien encroachment	Operation	**Medium**	-	**Low**	-
B8	Recovery of vegetation community and reduction of alien invasive plant species	Operation	**Low**	+	**Medium**	+
B9	Preservation of faunal communities	Operation	**Low**	+	**Low**	+
SE1	Employment opportunities	Construction	**Low**	+	**Medium**	+
T1	Increased local traffic	Construction	**Low**	-	**Low**	-
HS1	Employee health and Safety	Construction	**Medium**	-	**Low**	-
H1	Damage to heritage resources	Construction	**Low**	-	**Low**	-

8.4 IMPACT STATEMENT

The overall objective of the BA application is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the EMPr) is sufficient for the MDARDLEA to make an informed decision for the environmental authorisation being applied for in respect of this project.

Mitigation measures have been developed, where applicable, for the above aspects and are presented within the EMPr (Appendix F). It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

9 CONCLUSION

This report provides a description of the proposed project and details the aspects associated with the construction and operation. The report also includes the methodology followed to undertake the BA process. A detailed description on the existing environment (bio-physical as well as socio-economic) is provided based on findings from the specialist surveys and existing information. Stakeholder engagement was undertaken from the onset of the project in a transparent and comprehensive manner. Outcomes of all comments received from the public review period will be recorded and responded to in the Final BA Report. Based on the environmental description, specialist surveys as well as the stakeholder engagement, a detailed impact assessment was undertaken and, where relevant, the necessary management measures have been recommended.

In summary, the BA process assessed both biophysical and socio-economic environments and identified appropriate management and mitigation measures. The biophysical impact assessment revealed that there are no environmental fatal flaws and no significant negative impacts associated with the proposed project should mitigation and management measures be implemented. In addition, it should be noted that the socio-economic impacts associated with the project are positive but limited.

The Draft BA Report was made available for public review from **8 September to 11 October 2021**. All issues and comments submitted to WSP will be incorporated in the CRR which will be included in the Final BA Report.

It is the opinion of WSP that the information contained in this document is sufficient for the MDARDLEA to make an informed decision for the EA being applied for in respect of this project.

If you have any further enquiries, please feel free to contact:

WSP Group Africa (Pty) Ltd

Attention: Lukanyo Kewana

PO Box 98867, Sloane Park, 2152

Tel: 011 361 1400

E-mail: Lukanyo.Kewana@wsp.com

10 REFERENCES

ADU (Animal Demography Unit). (2019). Virtual Museum. (Accessed: June 2020).

Alexander, G. & Marais, J. (2007). A guide to the Reptiles of Southern Africa. Struik, Cape Town.

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (Eds). (2014). Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African Biodiversity Institute, Pretoria.

BGIS. (Biodiversity GIS) (2017). http://bgis.sanbi.org/. (Accessed: June 2020).

Birdlife South Africa. (2015). Checklist of Birds - List of Threatened Species. https://www.birdlife.org.za/publications (Accessed: June 2020

BODATSA-POSA (2019). Plants of South Africa - an online checklist. POSA ver. 3.0. http://newposa.sanbi.org/. (Accessed: June 2020).

Branch, W.R. (1998) Field Guide to Snakes and Other Reptiles of Southern Africa. Struik, Cape Town.

CBD (Convention on Biological Diversity). (1993). https://www.cbd.int/doc/legal/cbd-en.pdf. (Accessed: June 2018).

CBSS. (2015). Integrated Water and Waste Management Plan 2016 – 2020 for Sasol South Africa (Pty) .

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) (1973). www.cites.org. (Accessed: June 2018).

Del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A., Fishpool, L.D.C., Boesman, P. & Kirwan, G.M. (1996). HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 2: Passerines. Lynx Editions and BirdLife International, Barcelona, Spain and Cambridge, UK.

Department of Water Affairs and Forestry, 2005. A practical field procedure for identification and delineation of wetland and riparian areas. DWAF, Pretoria.

Department of Water and Sanitation, 2011. The Ground Water Dictionary: Second Edition, [Accessed: September 2018].

Du Preez, & Carruthers, V. (2009) A Complete Guide to the Frogs of Southern Africa. Struik Nature, Cape Town.

Eskom. (2014). Taylor, M.R., Peacock, F. & Wanless, R.M. (Eds). The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

EWT. (2016). Mammal Red List 2016. www.ewt.org.za (Accessed: June 2020).

Food and Agriculture Organization (FAO), 1980. Drainage design factors. FAO Irrigation and Drainage Paper No. 38. Rome.

FrogMap (2017). The Southern African Frog Atlas Project (SAFAP, now FrogMAP). http://vmus.adu.org.za (Accessed in June 2020).

Golder Associates. 2018. SASOL SYNFUELS OPERATIONS, Reinstatement and Development of existing VBC08 Wetland System Report Number: 1772759-318477-1

Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. (Eds). (2005). Roberts – Birds of Southern Africa, VIIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town.

IUCN (2017). The IUCN Red List of Threatened Species. www.iucnredlist.org (Accessed: November 2017).

Johnson, S. & Bytebier, B. (2015). Orchids of South Africa: A Field Guide. Struik publishers, Cape Town.

Kotze, D.C, Marneweck, G.C., Batchelor, A.L., Lindley, D. and Collins, N. 2004. Wetland Assess: A rapid assessment procedure for describing wetland benefits. Mondi Wetland Project. Unpublished report.

Le Roux, P. A., Hensley, M., Lorentz, S. A., van Tol, J. J., van Zijl, G. M., Kuenene, B. T., Jacobs, C. C. (2015). HOSASH: (Hydrology of South African Soils and Hillslopes. Water Research Commission.

Macfarlane, D.M., Dickens, J. and Von Hase, F. 2009. Development of a methodology to determine the appropriate buffer zone width and type for developments associated with wetlands, watercourses and estuaries Deliverable 1: Literature Review. INR Report No: 400/09

Mahmoud, S. H and Alazba, A.A. 2015. Hydrological Response to Land Cover Changes and Human Activities in Arid Regions Using a Geographic Information System and Remote Sensing. VL10 DO 10.1371/journal.pone.0125805JO.

MammalMap (2017). http://mammalmap.adu.org.za/ (Accessed: June 2020).

Measey, G.J. (2011). Ensuring a Future for South Africa's Frogs: A Strategy for Conservation Research. South African National Biodiversity Institute, Pretoria.

Minter, L., Burger, M., Harrison, J.A. & Kloepfer, D. (2004). Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. Smithsonian Institute Avian Demography Unit, Washington; Cape Town.

Monadjem, A., Taylor, P.J., Coterrill, F.D.P. & Schoeman, C. (2010). Bats of southern and central Africa: a biogeographic and taxonomic synthesis. Wits University Press, Johannesburg.

MTPA. (2014). Mpumalanga Biodiversity Sector Plan Handbook. Lötter, M.C., Cadman, M.J. & Lechmere-Oertel, R.G. (Eds.). Mpumalanga Tourism and Parks Agency, Mbombela (Nelspruit).

Mpumalanga Tourism and Parks Agency (1998). Mpumalanga Nature Conservation Act 10 of 1998.https://cer.org.za/wp-content/uploads/2016/03/10-of-1998-Mpumalanga-Nature-Conservation-Act.pdf (Accessed: June 2020).

Mucina, L. and Rutherford, M.C. (Eds.). (2006). The vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria South African.

Mucina, L., Rutherford, M.C. & Powrie, L.W. (Eds.). (2007). Vegetation map of South Africa, Lesotho and Swaziland. 1:1 000 000 scale sheet maps. 2nd ed. South African National Biodiversity Institute, Pretoria.

NBA. (2018). Terrestrial Ecosystem Threat Status 2018. http://bgis.sanbi.org/. (Accessed: June 2020)

NBF (2009). National Biodiversity Framework. www.environment.gov.za (Accessed: June 2018).

NPAES (2011). National Protected Areas Expansion Strategy. www.environment.gov.za (Accessed: June 2018).

Pooley, E. (1998): A Field Guide to Wild Flowers: KwaZulu-Natal and Eastern Region. The Flora Publications Trust; ABC Bookshop, Durban.

Raimonde, D. (2009). Red list of South African Plants. SANBI, Pretoria.

Rountree, M.W. and Kotze, D.C. (2013) Specialist Appendix A3: EIS Assessment. In: Rountree MW, Malan HL and Weston BC (eds.); Manual for the Rapid Ecological Reserve Determination of Inland Wetlands (Version 2.0); WRC Report No. 1788/1/13. Water Research Commission, Pretoria, pp. 42-46.

SABAP2 (Bird Atlas Project). (2019). http://vmus.adu.org.za/. (Accessed: June 2020).

SAPAD (South Africa Protected Areas Database) (2019). http://egis.environment.gov.za

SANBI (2018). South African National Biodiversity Institute (2006-2018). The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), Online, http://bgis.sanbi.org/Projects/Detail/186, Version 2018.

SANBI (2014).South African National Biodiversity Institute. Mpumalanga Highveld Wetlands 2012 [vector geospatial dataset] 2014. Available from the Biodiversity GIS website, downloaded on June 2020

SANBI. (2016). Red List of South African Plants version 2017.1. Redlist.sanbi.org (Accessed: June 2020).

SANBI. (2017). Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning. Driver, A., Holness, S. & Daniels, F. (Eds). 1st Edition. South African National Biodiversity Institute, Pretoria.

SARCA. (2018). South African Reptile Conservation Assessment. http://sarca.adu.org.za/ (Accessed: June 2020).

Skinner J.D. & Chimimba, C.T. (2005). The Mammals of the Southern African Subregion (New Edition). Cambridge University Press. South Africa.

Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). (2019). South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.

SRK. (2013). Draft Basic Assessment Report ("BAR") and Environmental Management Plan ("EMP") for the Seepage Reduction Activities and the Construction of Monitoring Weirs within Sasol Synfuels Industrial Complex Located in Secunda.

Stuart, C. & Stuart, T. (1994). A field guide to the tracks and signs of Southern, Central East African Wildlife. Struik Nature, Cape Town.

Taylor, M.R., Peacock, F. & Wanless, R.M. (Eds). (2015). The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

UNFCC. (1994). The United Nations Framework Convention on Climate Change. unfccc.int/resource/docs/convkp/conveng.pdf. (Accessed: June 2018).

Van Oudtshoorn, F. (2004). Gids tot die Grasse van Suider-Afrika. Second Edition. Briza Publikasies, Pretoria.

Van Wyk, B. & Van Wyk, P. (1997). Field guide to Trees of Southern Africa. Struik Publishers, Cape Town.

Van Wyk, B. & Malan, S. (1997). Field Guide to the Wild Flowers of the Highveld: Also Useful in Adjacent Grassland and Bushveld, Struik Publishers, Cape Town.

Van Wyk, B-E., Van Oudtshoorn, B. & Gericke, N. (2013). Medicinal Plants of South Africa. Briza Publications, Pretoria.

Van Wyk, B-E. & Smith, G.F. (2014). Guide to the Aloes of South Africa. Briza Publishers, Pretoria.

Wet Earth Eco-Specs. 2019. Sasol Secunda Industrial Complex: Wetland Assessment Review 2019. PO number: 45058836637.

Wet Earth Eco-Specs. 2020. Wetland Management Plan for Sasol Secunda Industrial Complex and Surroundings. PO No. 4506230934.

WMB. (2000). Integrated Water Management Plan for the Sasol Secunda Industrial and Mining Complex.

APPENDIX

A EAP AND SPECIALIST CURRICULUM VITAE

APPENDIX

B EAP'S DECLARATION OF INTEREST

APPENDIX

C SPECIALISTS DECLARATION OF INTEREST

APPENDIX

D SPECIALIST REPORTS

APPENDIX

D-1 *BIODIVERSITY ASSESSMENT*

APPENDIX

D-2 *HYDROLOGICAL ASSESSMENT*

APPENDIX

D-3 *HYDROPEDOLOGICAL STUDY*

APPENDIX

E STAKEHOLDER ENGAGEMENT

APPENDIX

E-1 *I&AP DATABASE*

E-2 *NEWSPAPER ADVERT*

E-3 SITE NOTICE

APPENDIX

E-4 NOTIFICATION LETTER

APPENDIX

F

DRAFT EMPR