



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Basic Assessment Report And Environmental Management Programme

for Listed Activities Associated with the Twistdraai
Export Plant, Sasol Mining (Pty) Ltd, Mpumalanga
Province

Environmental Authorisation in Support of the
Proposed Construction of a Pump Station and Pipeline
at Wollie se Gat

DRAFT REPORT FOR PUBLIC REVIEW

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 (ACT NO. 59 OF 2008) (NEM:WA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) (MPRDA) (AS AMENDED).

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File Reference Number SAMRAD:	MP30/5/1/2/3/2/1(138)EM



DIGBY WELLS
ENVIRONMENTAL

This document has been prepared by Digby Wells Environmental.

Report Type:	Basic Assessment Report and Environmental Management Programme
Project Name:	Proposed Construction of a Pump Station and Pipeline at Wollie se Gat, Twistdraai Export Plant, Sasol Mining (Pty) Ltd, Mpumalanga Province
Project Code:	SAS6986

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IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic 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 the 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 managed, avoided 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 manage, avoid or mitigate identified impacts; and
 - identify residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Introduction

Sasol Mining (Pty) Ltd (Sasol Mining): Twistdraai Export Plant (TEP) seeks to undertake the regulated Basic Assessment (BA) Process to obtain an Environmental Authorisation (EA) for the construction of a pump station and associated infrastructure (i.e., pump and pipeline through a wetland and upgrade a road) at and from Wollie se Gat. Wollie se Gat is an old quarry located in close proximity to Sasol Synfuels Operations (SSO) and the TEP Fine Coal and Discard Facility (the TEP Discard Facility).

Project applicant

The particulars for the project applicant, Sasol Mining TEP, are detailed in the table below.

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Project overview

TEP is Sasol Mining's export coal beneficiation plant and processes coal from the Twistdraai Colliery Thubelisha Shaft (TCTS) for the export market. TEP receives coal via an overland conveyor belt from the TCTS underground mining operation. The export-grade coal is reclaimed from the product stockpiles and transported to the load-out silo, where it is loaded onto rail trucks through a rapid load-out station and transported to the Richards Bay Coal Terminal (RBCT) for export. Not only does the TEP provide high-grade, low-ash coal for export purposes; but it also supplies coal middlings for use by the SSO via Sasol Coal Supply (SCS).

The TEP Discard Facility was identified as a contamination source at the groundwater monitoring points RESM13 and RESM7. One of the proposed remediation options that were considered and that will be implemented, is the interception of contaminated water to ensure the contamination is limited and confined to the immediate area. Pumping from Wollie se Gat is a cost-effective remediation option. The water will be abstracted from Wollie se Gat and pumped to the lined solution trenches of the TEP Discard Facility and allowed to flow to the Return Water Dam (RWD) from where it is reused in the coal beneficiation process.

The following activities relate to this EA Application:

- Establishment of access road-upgrading of an existing two spoor track

- Establishment of the laydown area and contractor's offices in an existing disturbed area.
- Construction of a pump station;
- Construction of the pipeline;
- Power supply from an existing 22 kV overhead line
- Construction of a mini-substation
- Mobile sanitation facilities
- Rehabilitation of disturbed area; and

The proposed project triggers Listed Activities in terms of Listing Notice 1 (GN R 983 of 04 December 2014, as amended) and the associated Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 4 December 2014, as amended) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The proposed project triggers Activity 19 and Activity 27 of Listing Notice 1, as follows:

- 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; but excluding where such infilling, depositing, dredging, excavation, removal or moving"; and
- Activity 27: "The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required".

Purpose of this report

The overarching objectives of this Basic Assessment Report (BAR) are to:

- Describe the *status quo* of the biophysical environment of the project area;
- Identify and assess the potential environmental impacts associated with the proposed project; and
- Provide mitigation and management for the proposed activities.

This draft BAR will be made available to the public for input and comments over a legislative 30-day public review period, which will then be addressed and incorporated into a Final BAR to be submitted to the Department of Mineral Resources and Energy (DMRE) for consideration

Environmental consultants

Contact details for the independent Environmental Assessment Practitioner (EAP) are provided in the table below.

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Approach and methodology for the Public Participation Process

A Public Participation Process (PPP) as per the EIA Regulations, 2014 has been initiated. The PPP is designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate the proposed project.

The PPP for the proposed project has and will follow the steps described below:

- The stakeholder database was updated to ensure that the details of I&APs are correct and to include any additional I&APs in the broader project area;
- A Background Information Document (BID) and Notification Letter detailing the proposed project and availability of the Draft BAR for public review was sent to all registered I&APs on 30 April 2021 via email;
- An advertisement was placed in the Ridge times newspaper on the 30th April 2021 in English notifying I&APs of the proposed project and availability of the Draft BAR for public review, as well as inviting registration of I&APs and comments;
- Site notices were placed at prominent public areas around the project area to notify I&APs of the project;
- The Draft BAR was placed on the Digby Wells website and can be accessed via our data-free service for the prescribed 30-day public review period;
- Due to COVID-19 Regulations, the Draft BAR has not been placed at public locations, but has only been made available electronically;
- All comments received during the project will be captured in a Comments and Response Report (CRR);
- Following completion of the public review period, the Draft BAR will be updated to a final version and submitted to the DMRE for review and consideration; and

- Once the DMRE provides a decision on the proposed project, a letter will be distributed to registered I&APs. The letter will contain the DMRE's decision and relevant details of the appeal procedure.

Summary of the Potential Environmental Impacts

The BA Process, associated specialist studies and the PPP were undertaken and completed in fulfilment of the legislative requirements discussed in Section 10 (Part A) of this report. A quantitative impact rating methodology was applied to determine the significance of the expected impacts, both prior to mitigation and after mitigation measures are implemented.

Table A provides a summary of the key impacts (of moderate significance only) expected during the construction phase of the project. This report lists and assesses all the potential impacts and specifies associated mitigation measures.

Table A: Summary of the key impacts associated with the proposed new activities

Project Activity	Aspects Affected	Potential Impact	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
Development and upgrading of an existing permanent access road to the site.	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Soil compaction; Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; Soil erosion (surface erosion, head cut erosion) and sediment release to wetlands; Alteration of topographies; and Soil contamination from hydrocarbon or hazardous substance spills and leakages. 	Construction Phase	Moderate Negative - 84	Minor Negative - 40
Topsoil stripping and stockpiling	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Compaction of soil and therefore increased surface runoff; Increased erosion on unprotected soils and consequently sedimentation as these soils is highly erodible; Removal of vegetation and top soil decreasing the soil fertility; and Compaction, ponding and changes to the natural hydrological functioning of the landscape. 	Construction Phase	Moderate (negative) - 105	Minor (negative) -72
	Wetlands	<ul style="list-style-type: none"> Erosion and sedimentation of wetland areas; and Water quality and quantity contamination and deterioration. 	Construction Phase	Moderate (negative) -91	Minor (negative) -55
Construction of the pump station and the pipeline from the pump station to the Discard Facility solution trench.	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Removal of the soil changing the natural geomorphology; Soil erosion and sedimentation; Soil compaction and topsoil loss leading to reduced fertility; Soil contamination from hydrocarbon spills from machinery; Migration of soil contaminants into groundwater and contaminating surface water systems; and Decrease in land use and land capability (agricultural potential). 	Construction Phase	Moderate (negative) - 98	Minor (negative) - 60
	Wetlands	<ul style="list-style-type: none"> Wetland fragmentation; Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; Increased Alien Invasive Plants (AIPs); Erosion and sedimentation of wetland areas; and Loss of wetland areas. 	Construction Phase	Moderate (negative) -91	Minor (negative) -55
Waste generation and removal of waste.	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Soil contamination Decreased soil fertility and land capability; and Soil compaction. 	Construction Phase	Moderate (negative) - 84	Negligible (negative) - 32

Conclusions and recommendations

Based on the environmental assessment presented in this report and the specialists' reports, this BA process concludes that the main impacts of concern will occur during the construction phase of the project. However, assuming that all the phases of the project adhere to the conditions stated in the EMPr (Part B of this report), it is believed that all impacts associated with the proposed project will have no significant, adverse environmental impacts on the surrounding environment.

Key findings of the BA process include:

- All the identified impacts will be of moderate to minor significance. The significance of potential environmental impacts can be reduced to minor or negligible impacts with the implementation of mitigation measures and environmental monitoring;
- The wetland impact assessment did not indicate that the proposed activities will have a large impact on the wetland. The current project area is heavily impacted by other land use activities and the proposed pipeline will therefore not have a significant impact on the wetland with the implementation of the necessary mitigation measures; and
- The current land use cumulatively impacts on the current soil resources and therefore, the land capability of the project area. Contaminated soil will directly impact the water quality and quantity as well as vegetation of the area; however, these impacts can be deemed to be of low significant if the recommended mitigations are implemented.

The pipeline will likely have a long-term positive effect on the wetland as the contaminated water emanating from the Wollie se Gat will be extracted from the quarry wetland and pumped into the RWD and then reused in the process. This will allow the wetland to possibly recover and increase the health and ecological services it currently provides.

On this basis, it is recommended that the proposed project be granted an EA, on the condition of implementation of the following key recommendations:

- Recreate wetland habitat after construction of the pipeline. Ensure proper landscaping, shaping and revegetation;
- Improve vegetation cover and establish hydrophytic plants and facultative hydrophytes that are native to the area. If self-vegetation has not occurred in 3 months, re-seeding should be done;
- Reduce the risk of erosion, compaction and the creation of preferential flow paths;
- Maintain linear infrastructure, such as roads;
- Prevent contaminated water from entering the wetland. If spills or leakages from the pipeline occur, it should be cleaned up immediately;
- If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place;

- Runoff must be controlled and managed using proper stormwater management measures;
- Restrict vehicle movement over sensitive areas to reduce soil compaction;
- Do not rip/shape the area in the wet season;
- If soil is polluted, treat the soil using *in situ* bioremediation. If *in situ* treatment is not possible, then the polluted soil must be classified according to the National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN R635 of 23 August 2013) and disposed of at an appropriate, permitted or licensed disposal facility;
- All vehicles and machines must be parked within hardstanding areas during the construction phase and must be checked daily for leaks;
- Re-fuelling must take place on a sealed surface area away from soils to prevent seepage of hydrocarbons into the soil;
- Place drip trays where vehicles or machinery are parked;
- Fuel, grease and oil spills should be remediated using a commercially available emergency clean up kits;
- Any contractors on site must ensure that all employees are aware of the procedure for dealing with spills and leaks and undergo training on-site; and
- Soil monitoring should be conducted at selected locations on the project site to detect any extreme levels of pollutants;
- Establish effective soil cover, such as lawn grass around constructed infrastructure for adequate protection from wind and water erosion; and
- Minimise unnecessary removal of the natural vegetation cover outside the development footprint.

TABLE OF CONTENTS

Part A: Scope of Assessment and Basic Assessment Report	1
1 Introduction	2
2 Project Applicant and Environmental Assessment Practitioner	3
2.1 <i>Details of the Applicant</i>	3
2.2 <i>Details of Environmental Assessment Practitioner</i>	3
2.3 <i>Expertise of the Environmental Assessment Practitioner</i>	4
2.3.1 The Qualifications of the Environmental Assessment Practitioner	4
2.3.2 Summary of the Environmental Assessment Practitioner's past experience	4
3 Locality Map	5
4 Location of the Overall Activity	8
5 Description of the Scope of the Proposed Overall Activity	10
5.1 <i>Listed and Specified Activities</i>	10
5.2 <i>Description of the Activities to be Undertaken</i>	12
5.2.1 Establishment of Access Roads	14
5.2.2 Establishment of a Laydown and Contractor's Camp	14
5.2.3 Construction of the Pipeline	14
5.2.4 Construction of the Pump Station	14
5.2.5 Power Supply	15
5.2.6 Water Supply	15
5.2.7 Sanitation Facilities	15
5.2.8 Waste Management	15
5.2.9 Rehabilitation of Disturbed Areas	15
6 Policy and Legislative Context	15
7 Need and Desirability of the Proposed Activities	18
7.1 <i>Social and Economic Considerations</i>	18
7.2 <i>Environmental Considerations</i>	18
8 Motivation for the Overall Preferred Site, Activities and Technology Alternative	18

9	Full Description of the Process Followed to Reach the Proposed Preferred Alternatives within the Site	19
9.1	<i>Details of the Development Footprint Alternatives Considered</i>	<i>19</i>
10	Details of the Public Participation Process followed.....	19
10.1.1	Announcement Phase	19
10.1.2	Identification of Stakeholders	19
10.1.3	Public Participation Documentation	20
10.2	<i>Basic Assessment Phase</i>	<i>20</i>
10.3	<i>Summary of Public Participation Activities Undertaken to Date.....</i>	<i>21</i>
10.4	<i>Decision Making Phase</i>	<i>22</i>
10.5	<i>Summary of Issues Raised by IA&Ps</i>	<i>22</i>
11	The Environmental Attributes Associated with the Alternatives.....	22
11.1	<i>Climate</i>	<i>22</i>
11.2	<i>Topography</i>	<i>23</i>
11.3	<i>Geology</i>	<i>23</i>
11.4	<i>Soil and Land Capability and Land Use</i>	<i>27</i>
11.4.1	Soils Forms.....	27
11.4.2	Land use.....	29
11.4.3	Land Capability	29
11.4.4	Flora	30
11.5	<i>Wetland</i>	<i>33</i>
11.5.1	Wetland Ecological Health Assessment.....	35
11.5.2	Wetland Ecosystem Services (WET-EcoServices).....	35
11.5.3	Ecological Importance and Sensitivity.....	37
11.6	<i>Heritage.....</i>	<i>38</i>
11.6.1	Secondary Data Sources	39
11.6.2	Primary Data Collection	39
11.6.3	Regional Cultural Heritage Baseline	40
11.6.4	Results of the Pre-disturbance Survey.....	43
11.7	<i>Description of the Current Land Uses</i>	<i>46</i>
11.8	<i>Description of Specific Environmental Features and Infrastructure on the Site</i>	<i>46</i>

12	Impacts and Risks Identified including the Nature, Significance, Consequence, Extent, Duration and Probability of the Impacts	48
12.1	<i>Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.....</i>	<i>48</i>
12.2	<i>Construction Phase</i>	<i>53</i>
12.2.1	Soil, Land use and Land Capability.....	53
12.2.2	Wetland	68
12.3	<i>Operational Phase.....</i>	<i>80</i>
12.3.1	Soil, Land use and Land Capability.....	80
12.3.2	Wetlands	82
12.4	<i>Decommissioning and Rehabilitation Phase.....</i>	<i>83</i>
12.4.1	Soil, Land use and Land Capability.....	83
12.4.2	Wetlands	87
12.5	<i>Cumulative Impacts.....</i>	<i>91</i>
12.5.1	Soil, Land Use and Land Capability	91
12.5.2	Wetlands	92
12.5.3	Heritage.....	92
12.6	<i>Unplanned and Low Risk Events.....</i>	<i>92</i>
12.7	<i>The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.....</i>	<i>94</i>
12.8	<i>The Possible Mitigation Measures that could be Applied and the Level of Risk</i>	<i>94</i>
12.9	<i>Motivation where no Alternatives Sites were Considered.....</i>	<i>94</i>
12.10	<i>Statement Motivating the Alternative Development Location within the Overall Site.....</i>	<i>94</i>
13	Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity.....	94
14	Assessment of Each Identified Potentially Significant Impact and Risk.....	96
15	Summary of Specialist Reports	99
16	Environmental Impact Statement.....	101

16.1	<i>Summary of the Key Findings of the Environmental Impact Assessment.....</i>	101
16.2	<i>Final Site Map</i>	103
16.3	<i>Summary of the positive and negative implications and risks of the proposed activity and identified alternatives</i>	103
17	Proposed Impact Management Objectives and the Impact Management Outcomes for Inclusion in the EMPR	103
18	Aspects for Inclusion as Conditions of Authorisation	103
19	Description of any Assumptions, Uncertainties and Gaps in Knowledge	104
20	Reasoned Opinion as to Whether the Proposed Activity Should or Should Not be Authorised	105
20.1	<i>Reasons why the Activity Should be Authorised or Not.....</i>	105
20.2	<i>Conditions that Must be Included in the Authorisation</i>	105
21	Period for which the Environmental Authorisation is Required.....	106
22	Undertaking.....	107
23	Financial Provision	107
23.1	<i>Explain how the aforesaid amount was derived</i>	107
23.2	<i>Confirm that this amount can be provided for from operating expenditure</i>	107
24	Specific Information required by the competent Authority	107
24.1	<i>Impact on the socio-economic conditions of any directly affected person</i>	107
25	Other matters required in terms of sections 24(4)(a) and (b) of the Act	107
Part B: Environmental Management Programme Report		108
1	Details of the Environmental Assessment Practitioner.....	109
2	Description of the Aspects of the Activity	109
3	Composite Map	109
4	Determination of Closure Objectives	109
4.1	<i>Volumes and Rate of Water Use Required for the Operation.....</i>	109
4.2	<i>Has a water use licence has been applied for.....</i>	110
5	Impacts to be mitigated in their respective phases	111
6	Impact management outcomes	122
7	Financial provision.....	134
7.1	<i>Determination of the amount of Financial Provision</i>	134

7.1.1	Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.....	134
7.1.2	Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties	134
7.1.3	Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure	134
7.1.4	Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives	135
7.1.5	Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline	135
7.1.6	Confirm that the financial provision will be provided as determined	135
8	Monitoring compliance with and performance assessment.....	135
8.1	<i>Monitoring of Impact Management Actions.....</i>	135
8.2	<i>Monitoring and reporting frequency</i>	135
8.3	<i>Responsible persons</i>	136
8.4	<i>Time period for implementing impact management actions</i>	136
8.5	<i>Mechanism for monitoring compliance.....</i>	136
9	Indicate the frequency of the submission of the performance assessment/ environmental audit report.....	139
10	Environmental Awareness Plan.....	139
10.1	<i>Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.....</i>	139
10.2	<i>Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment</i>	140
10.3	<i>General Environmental Awareness Training and Requirements.....</i>	140
10.3.1	Induction training	140
10.3.2	Other training.....	140
10.3.3	Environmental awareness training	141
10.3.4	Frequency of Training.....	141
11	Specific information required by the Competent Authority	141
12	Reference list	143

LIST OF FIGURES

Figure 3-1: Regional Setting.....	6
Figure 3-2: Locality Map.....	7
Figure 4-1: Land Tenure	9
Figure 5-1: Proposed Infrastructure Map.....	13
Figure 11-1: Topography of the Project Area	24
Figure 11-2: Slope of the Project Area	25
Figure 11-3: Geology of the Project Area	26
Figure 11-4: Augered Soils	27
Figure 11-5: Soil Types	28
Figure 11-6: Land use activities	29
Figure 11-7: Regional Vegetation.....	32
Figure 11-8: Wetland Indicators	33
Figure 11-9: Wetland Delineation of the Project Area.....	34
Figure 11-10: Animal Activity within the wetland.....	38
Figure 11-11: Cultural Heritage Resource identified within the Study Area under consideration	43
Figure 11-12: Results of the Pre-disturbed Survey showing the Existing Environment.....	44
Figure 11-13: Results of the Pre-disturbance Survey	45
Figure 11-14: Land Uses of the Project Area	47

LIST OF TABLES

Table 2-1: Contact Details of the Applicant	3
Table 2-2: Contact details of the EAP	4
Table 4-1: Property Details	8
Table 5-1: Listed Activities	11
Table 6-1: Legislation and Guidelines Applicable to the Proposed Project	16
Table 10-1: Public Participation Activities.....	21

Table 11-1: Land capability classification of the project area.....	30
Table 11-2: Plant species characterised of the Soweto Highveld Grassland	30
Table 11-3: Wetland Ecological Importance and Sensitivity Score	35
Table 11-4: EcoServices radial plots and scores obtained for each HGM unit.....	36
Table 11-5: Wetland Ecological Importance and Sensitivity Scores	37
Table 11-6: Secondary data sources.....	39
Table 11-7: Archaeological periods in Mpumalanga, adapted from Esterhuysen & Smith (2007)	42
Table 12-1: Summary of Project Activities.....	48
Table 12-2: Impact Assessment Parameter Ratings	50
Table 12-3: Probability/ Consequence Matrix.....	51
Table 12-4: Significance Rating Description.....	52
Table 12-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Construction Phase	53
Table 12-6: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Wetlands during the Construction Phase	68
Table 12-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase.....	80
Table 12-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Wetlands during the Operational Phase.....	82
Table 12-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Decommission and Rehabilitation Phase	83
Table 12-10: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Wetlands during the Operational Phase.....	88
Table 12-11: Unplanned Events, Low Risks and their Management Measures	93
Table 14-1: Assessment of Each Identified Impact.....	96
Table 15-1: Specialist studies undertaken for the Proposed Project.....	99
Table 19-1: Specialist Studies Assumptions, Uncertainties and Gaps.....	104
Table 4-1: Proposed New Water Uses	110
Table 5-1: Impacts to be Mitigated	111
Table 6-1: Summary of Impact Management Outcomes	122
Table 8-1: Monitoring Plan	137

LIST OF APPENDICES

- Appendix A: Details of the EAP
- Appendix B: Plans
- Appendix C: Wetlands Impact Assessment
- Appendix D: Soil Impact Assessment
- Appendix E: Heritage Impact Assessment
- Appendix F: Rehabilitation Plan

LIST OF PLANS

Plan 1: Regional Setting.....	1
Plan 2: Local Setting	1
Plan 3: Land Tenure Map.....	1
Plan 4: Infrastructure Map	1
Plan 5: Topographic Map of the Project Area	1
Plan 6: Slope of the Project Area	1
Plan 7: Geology of the Project Area	1
Plan 8 Soil Type Delineated.....	1
Plan 9: Regional Vegetation of the Project Area.....	1
Plan 10: Wetland Delineation of the Project Area.....	1
Plan 11: Pre-disturbance Survey.....	1
Plan 12: Land Uses of the Project Area	1
Plan 13: Composite Map.....	1

LIST OF ACRONYMS, ABBREVIATIONS AND TERMS

Acronym, Abbreviation or Term	Definition
AD	Anno Domini
AIP	Alien Invasive Plants
BA	Basic Assessment
BAR	Basic Assessment Report
BC	Before Christ
BCE	Before Common Era
BID	Background Information Document
CARA	The Conservation of Agricultural Resources Act
CFC	Chance Finds Protocol
CRR	Comments and Response Report
DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioner's Association of South Africa
EFC	Early Farming communities
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ELU	Existing Lawful Use
EMPr	Environmental Management Programme
ESA	Earlier Stone Age
EWT	Endangered Wildlife Trust
FFP	Fossil Finds Procedure
GA	General Authorisation
DWS	Department of Water and Sanitation
GSDM	Gert Sibande District Municipality
HDPE	High Density Polyethylene
HGM	Hydro-geomorphic
HIA	Heritage Impact Assessment

Acronym, Abbreviation or Term	Definition
I&APs	Interested and Affected Parties
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
LSA	Later Stone Age
MAE	Mean Annual Evaporation
mamsl	Metres above mean sea level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MRA	Mining Right Area
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID	Notification of Intent to Develop
PES	Present Ecological State
PPP	Public Participation Process
RBCT	Richard Bay Coal Terminal
RE	Remaining Extent
RSIP	Rehabilitation Strategy and Implementation Programme
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
Sasol Mining	Sasol Mining (Pty) Ltd
SCS	Sasol Coal Supply

Acronym, Abbreviation or Term	Definition
SFI	Soil Form Indicators
SSO	Sasol Synfuels Operations
TEP	Twistdraai Export Plant
TCTS	Twistdraai Thubelisha Colliery Shaft's
TOPS	Threatened or Protected Species
TUI	Terrain Unit Indicators
UVB	Unchanneled Valley Bottom
WUL	Water Use Licence

Part A: Scope of Assessment and Basic Assessment Report

1 Introduction

Sasol Mining (Pty) Ltd (Sasol Mining): Twistdraai Export Plant (TEP) seeks to undertake the regulated Basic Assessment (BA) Process to obtain an Environmental Authorisation (EA) for the construction of a pump station and associated infrastructure (i.e., pump and pipeline through a wetland and upgrade of an existing road) at and from Wollie se Gat. Wollie se Gat is an old quarry located in close proximity to Sasol Synfuels Operations (SSO) and the TEP Fine Coal and Discard Facility (the TEP Discard Facility).

TEP is Sasol Mining's export coal beneficiation plant and processes coal from the Twistdraai Colliery Thubelisha Shaft (TCTS) for the export market. TEP receives coal via an overland conveyor belt from the TCTS underground mining operation. The export-grade coal is reclaimed from the product stockpiles and transported to the load-out silo, where it is loaded onto rail trucks through a rapid load-out station and transported directly to the Richards Bay Coal Terminal (RBCT) for export. Not only does the TEP provide high-grade, low-ash coal for export purposes; but it also supplies coal middlings for use by the SSO via Sasol Coal Supply (SCS).

The TEP Discard Facility was identified as a contamination source at the groundwater monitoring points RESM13 and RESM7. One of the proposed remediation options that were considered and that will be implemented, is the interception of contaminated water to ensure the contamination is limited and confined to the immediate area. Pumping from Wollie se Gat is a cost-effective remediation option. The water will be abstracted from Wollie se Gat and pumped to the lined solution trenches of the TEP Discard Facility and allowed to flow to the Return Water Dam (RWD) from where it is reused in the coal beneficiation process.

The following activities relate to this EA Application.

- Establishment of Access road-upgrading of an existing two spoor track
- Establishment of the laydown area and contractor's offices within an already disturbed area.
- Construction of a pump station;
- Construction of the pipeline;
- Power supply from an existing 22 kV overhead line
- Construction of a mini-substation
- Mobile sanitation facilities
- Rehabilitation of disturbed area; and

The proposed project triggers Listed Activities in terms of Listing Notice 1 (GN R 983 of 04 December 2014, as amended) and the associated Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 4 December 2014, as amended) promulgated under the

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The proposed project triggers Activity 19 and Activity 27 of Listing Notice 1, as follows:

- “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; but excluding where such infilling, depositing, dredging, excavation, removal or moving”
- “The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required”.

2 Project Applicant and Environmental Assessment Practitioner

The section below provides details of the Project Applicant and Environmental Assessment Practitioner (EAP).

2.1 Details of the Applicant

The particulars for the project applicant, Sasol Mining TEP, are detailed in Table 2-1 below.

Table 2-1: Contact Details of the Applicant

Name of Applicant:	Sasol Mining (Pty) Ltd: Twistdraai Export Plant		
Registration number (if any):	1950/038590/07		
Contact person:	Welile Kheswa		
Physical address:	Twistdraai Export Plant, Nitrogen Road, Secunda, 2302		
Postal address:	Private Bag X1015, Secunda		
Postal code:	2302	Cell phone:	+27 84 702 3454
Telephone:	+27 17 614 3838	Fax:	+27 011 522 5279
Email:	Welile.Kheswa@sasol.com		

2.2 Details of Environmental Assessment Practitioner

Digby Wells Environmental (Digby Wells) has been appointed by Sasol Mining as the independent EAP to conduct the BA process and Public Participation Process (PPP) according to the NEMA. The particulars of the EAP are provided in the Table 2-2 and the Curriculum Vitae and EAP qualifications are attached in Appendix A.

Table 2-2: Contact details of the EAP

Company Name:	Digby Wells Environmental
Name of Practitioner:	Mia Smith
Telephone:	011 789 9495
Fax:	011 069 6801
Email:	mia.smith@digbywells.com
Physical Address:	Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191, South Africa
Postal Address:	Private Bag X10046, Randburg, 2125
EAPASA Registration No.	2019/1282

2.3 Expertise of the Environmental Assessment Practitioner

2.3.1 The Qualifications of the Environmental Assessment Practitioner

Mia Smith holds the following academic qualifications:

- Master of Science (MSc) – University of Johannesburg (2008);
- Bachelor of Science (BSc) Honours– University of Johannesburg (2006); and
- Bachelor of Science (BSc) – University of Johannesburg (2005).

2.3.2 Summary of the Environmental Assessment Practitioner’s past experience

Mia Smith is an Environmental Services Divisional Manager at Digby Wells. She holds a Master of Science (MSc) in Geography, with associated studies in Environmental Management and Energy Studies. She has experience within the environmental services field including but not limited to mining, industrial, energy and agricultural. She has more than 12 years working experience and re-joined Digby Wells Environmental as Manager of the Compliance Department in 2018. Mia is a registered EAP with EAPASA (Reg. No. 2019/1282).

She previously worked for Sappi SA as the Risk Manager and has over six years’ experience in auditing of ISO14001:2015 Environmental Management Systems, environmental legal compliance and environmental, water and waste authorisations.

3 Locality Map

Figure 3-1 illustrates the regional setting of the project area (Plan 1 in Appendix B). The TEP is located within the Sasol Secondary area in the Govan Mbeki Local Municipality in the Gert Sibande District Municipality of the Mpumalanga Province (Figure 3-2 and Plan 2 in Appendix B).

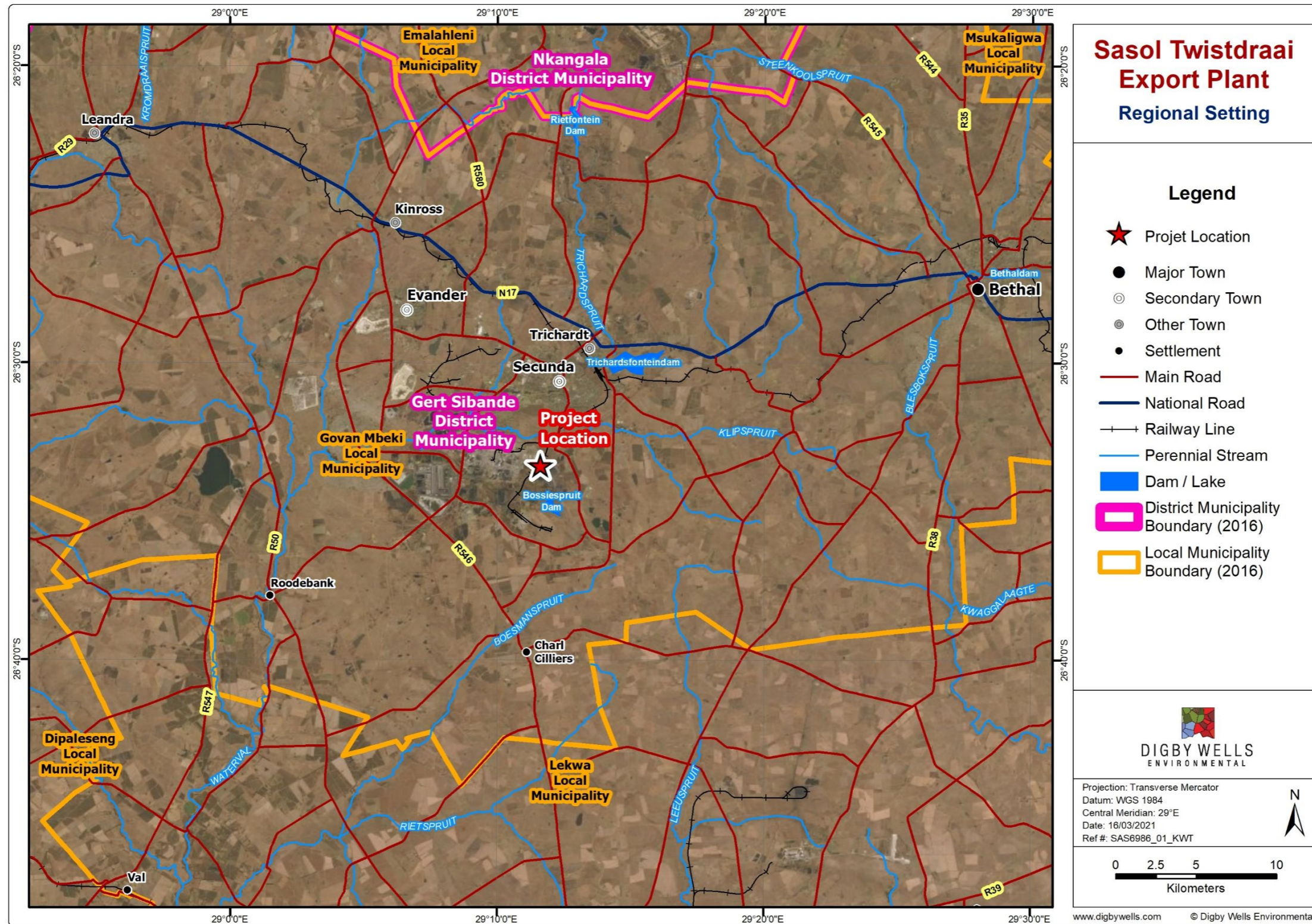


Figure 3-1: Regional Setting

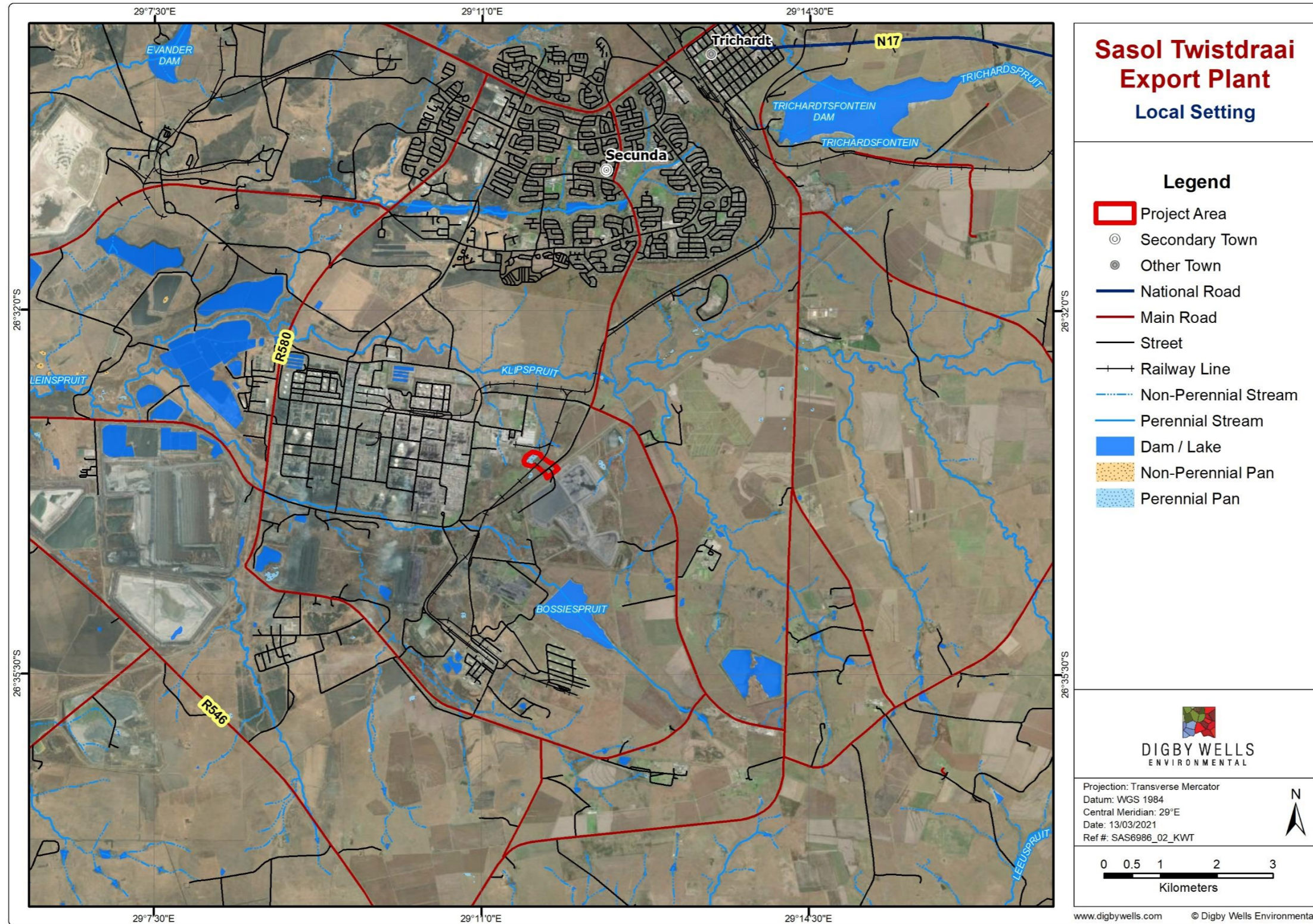


Figure 3-2: Locality Map

4 Location of the Overall Activity

Table 4-1 below provides the property details associated with the activities being applied for as part of this BA Process. The proposed project is located on the Remaining Extent (RE) of Portion 7 of the Farm Goedehoop 290 IS located in the Mpumalanga Province. Refer to Figure 4-1 for the Land Tenure Map (Plan 3 in Appendix B).

Table 4-1: Property Details

Farm Name:	The proposed project is located on the RE of Portion 7 of the farm Goedehoop 290 IS.		
Application Area (Ha):	12 ha (124 102 m ²) – extent of project area.		
Magisterial District:	0.46 ha (area to be disturbed for proposed pipeline).		
Distance and direction from nearest town:	The TEP is located 10 km south of Secunda in the Mpumalanga Province.		
21 digit Surveyor General Code for each farm portion:	Farm	Portion	Surveyor General Code
	Goedehoop 290 IS	Ptn 7 RE	T0IS00000000029000007

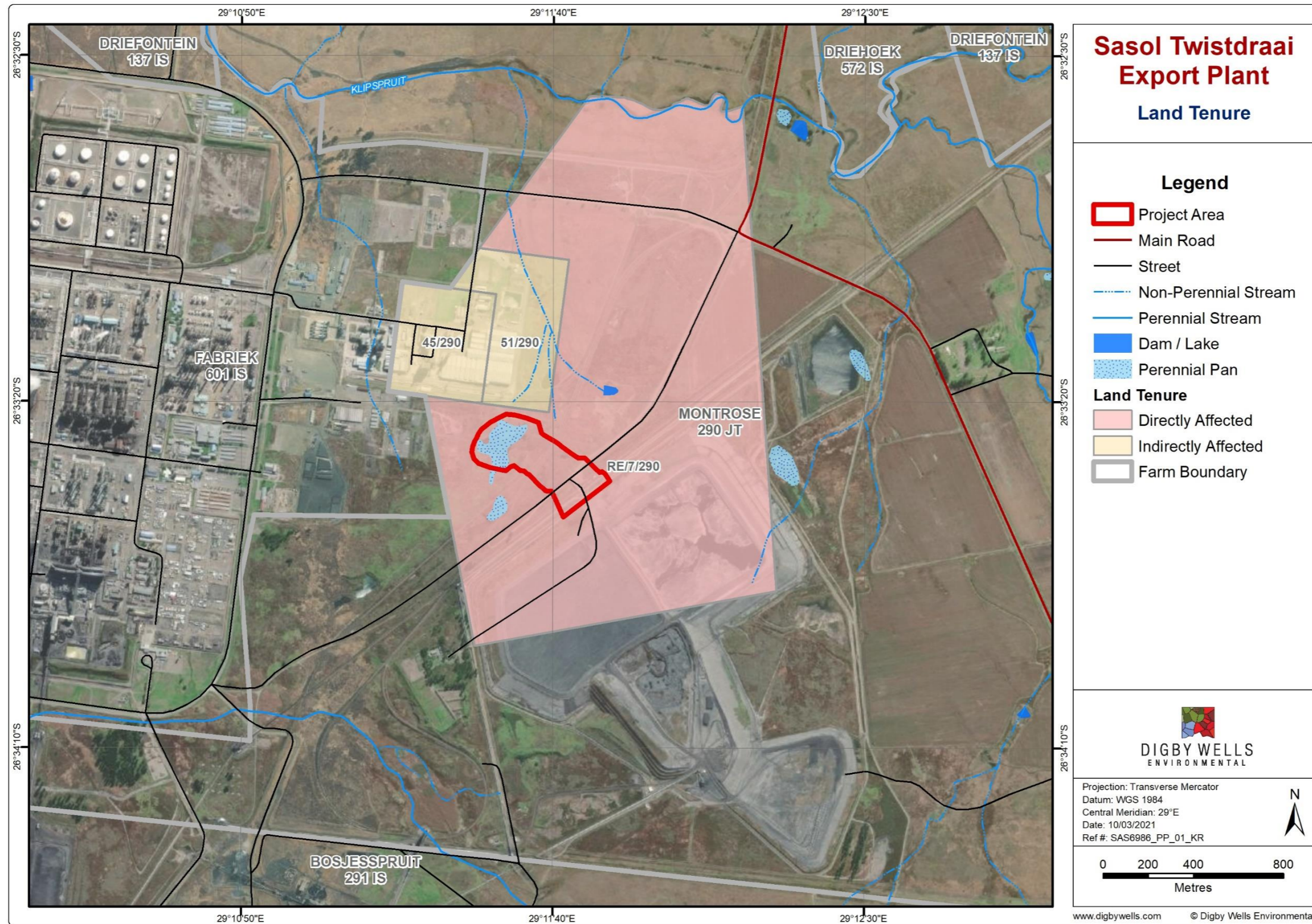


Figure 4-1: Land Tenure

5 Description of the Scope of the Proposed Overall Activity

The TEP has proposed the construction of a pump station at Wollie se Gat and associated infrastructure, including, ablutions, pump and pipeline and the upgrade of an existing road. It is foreseen that the water from Wollie se Gat will be pumped via an High Density Polyethene (HDPE) pipeline with a diameter of 200 mm and a length of 380 m to the solution trench at the TEP Discard Facility.

5.1 Listed and Specified Activities

Table 5-1 provides the identified Listed Activities as provided by Listing Notice 1.

Table 5-1: Listed Activities

Name of Activity	Aerial Extent of the Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Establishment of access road – upgrade of an existing two spoor track.	<ul style="list-style-type: none"> Less than 4 m wide. Vegetation clearance less than 1 ha. 	N/A	N/A	N/A
Establishment of a laydown area and contractor's offices.	Established within an already disturbed area further than 100 m from any watercourse or wetland.	N/A	N/A	N/A
Construction of pump station.	<ul style="list-style-type: none"> Vegetation clearance of more than 1 ha. Stripped topsoil depth of 300 mm. Drywell of 4.5 m wide and 5.3 m deep. 	X	Listing Notice 1 (GN R983 of 2014, as amended) Activity 19 and Activity 27	N/A
Construction of pipeline through a wetland.	<ul style="list-style-type: none"> A width of 3 m will be cleared. Trench of approximately 1.3 m below natural ground level. Pipeline length of 100 m through a wetland. Infilling of trench after pipeline construction is completed. 	X	Listing Notice 1 (GN R983 of 2014, as amended) Activity 19	N/A
Power supply will be sourced from an existing 22 kV overhead line that is approximately 500 m away from the quarry. The cable will be installed via trench running parallel to the pipeline through a wetland.	Tie-in link as a 22 kV cable with the length of 500 m from existing 22 kV overhead line.	X	Listing Notice 1 (GN R983 of 2014, as amended) Activity 19	N/A
Construction of a mini substation to start and stop the pump.	Mini substation to be installed on a cast <i>in situ</i> reinforced concrete slab. Typical Size: 3.2m x 1.3m x 0.3m in thickness. Slab to include bund wall sufficient to contain 100% volume of oil used in the mini substation in case of spillage. Environmentally friendly oil to be used.	N/A	N/A	N/A
Mobile sanitation facilities will be provided during construction, located outside the wetland area	Located outside the wetland	N/A	N/A	N/A
Rehabilitation of disturbed areas.	Disturbed area is more than 1 ha	N/A	N/A	N/A

5.2 Description of the Activities to be Undertaken

The proposed project entails the construction of a pump station within 500 m from a watercourse and a pipeline through a wetland to abstract contaminated groundwater from an old quarry, Wollie se Gat, and pump it to the lined solution trenches of the TEP Discard Facility, from where it will flow to RWD for reuse in the coal beneficiation process.

The infrastructure of the proposed project to be constructed is shown in Figure 5-1(Plan 4 in Appendix B).

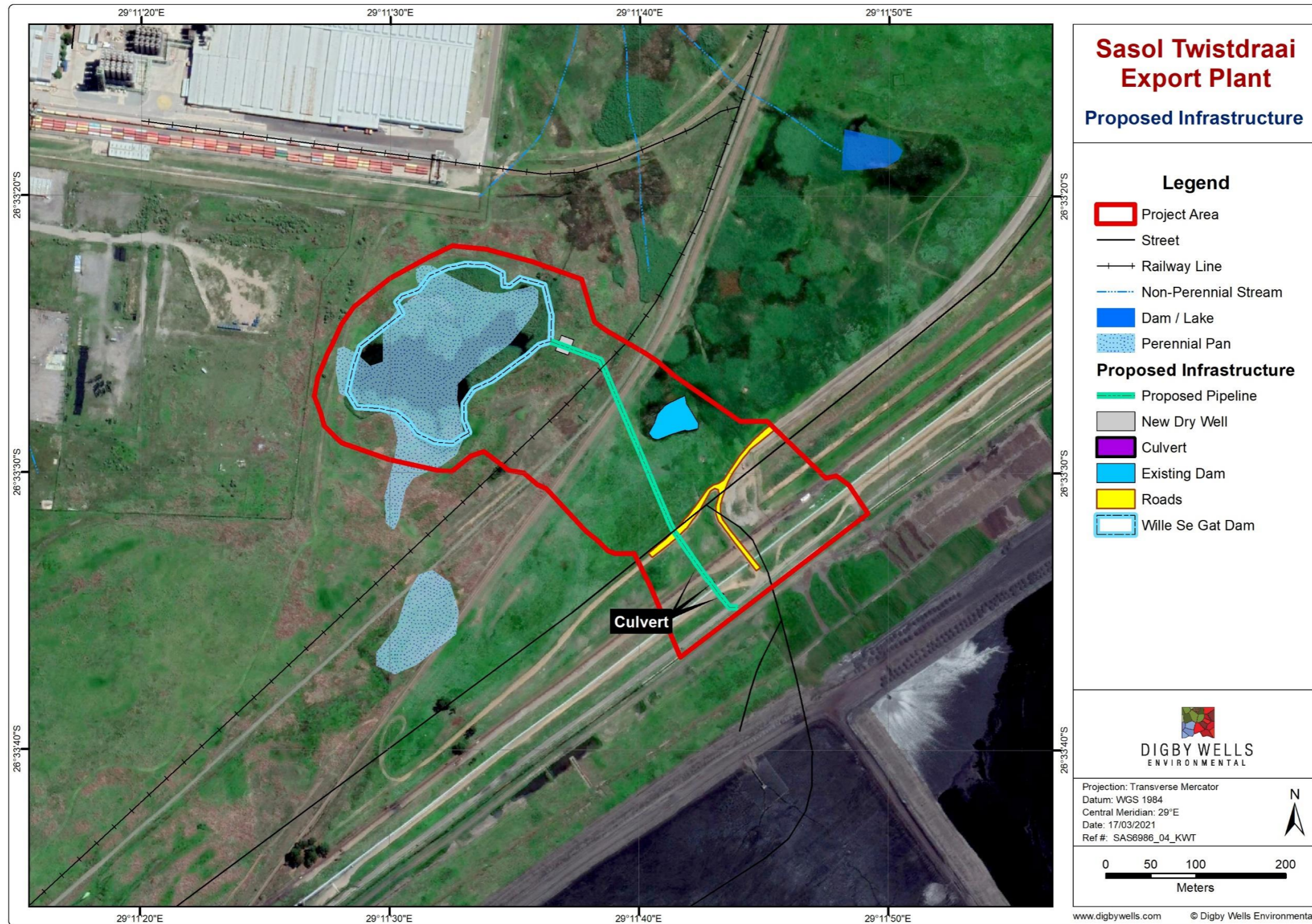


Figure 5-1: Proposed Infrastructure Map

5.2.1 Establishment of Access Roads

An existing informal two track road from the tar road to Wollie se Gat will be upgraded. This is to provide access for construction vehicles and equipment to the site during the operational phase. The upgrade will entail clearance of the vegetation and grading of the road with a grader. The road will be less than 4 m wide.

5.2.2 Establishment of a Laydown and Contractor's Camp

A laydown area and contractors' area will be established within an already disturbed area. The establishment of the construction camp area will include, but will not be limited to:

- Temporary site offices;
- Storage areas for construction material and equipment;
- Vehicle and equipment parking; and
- General and hazardous waste storage and collection area.

The area shall be established more than 100 m from any watercourse or wetland; and where possible, in an already disturbed area.

Concrete will be delivered in ready-mix trucks and will be deposited directly into the excavations and areas where it is required. No mixing of concrete will occur on-site.

5.2.3 Construction of the Pipeline

The pipeline will be constructed within an already disturbed area, crossing a wetland. A 3 m wide area will be cleared to make a trench for the pipeline. The trench will be dug with an excavator to a suitable depth.

The HDPE pipeline will be laid in a trench with a minimum depth of 1.3 m and backfilled with an engineer approved material. The pipeline will extend from the pump station in a south eastern direction towards the solution trench at the TEP Discard Facility, which is located approximately 380 m away. The section of the pipeline that will run through the wetland is approximately 100 m in length.

5.2.4 Construction of the Pump Station

A dry well (with dimensions 4.5 m wide and 5.3 m deep) will be constructed approximately 10 m away from the edge of the existing quarry. A directional drill will be used to drill a hole into the quarry which will then be used to abstract the water from the quarry. Ready-mix concrete will be used to reinforce the walls of the dry well.

The pumps will be placed at the bottom of the well and coupled to the pipeline once the pipeline construction has been completed.

5.2.5 Power Supply

Power supply will be sourced from an existing 22 kV overhead transmission line that is approximately 500 m away from the quarry. A tie-in link will be made using a 22 kV cable (22 kV 3c XLPE PVC SWA PVC Copper 35 mm²) from the existing 22 kV overhead line to the quarry, with the length of the cable being approximately 500 m. This cable will be installed via a trench running parallel to the pipeline. At the quarry, a mini substation with a 22/0.415 kV 200 kVA 4.50 % Dyn1 transformer will be used to step down the voltage to 400 V for the pumps and other auxiliary equipment (i.e., lights, electric fence, security cameras, etc.).

5.2.6 Water Supply

Water required during the construction phase will be sourced from the TEP. No water will be abstracted from Wollie se Gat without the necessary authorisations in place.

5.2.7 Sanitation Facilities

During the construction phase, service providers will provide portable chemical toilets at a number of locations at the pump station and along the pipeline route. It is proposed that one toilet is provided for every 15 people. However, all the portable toilets will be located outside the wetland area.

5.2.8 Waste Management

Waste will be separated into general and hazardous waste streams. Sufficient waste containers will be provided to prevent littering at the construction site. Hazardous waste containers will be provided in demarcated areas and will be removed from site by a service provider to a suitably licensed landfill site.

5.2.9 Rehabilitation of Disturbed Areas

All builder's rubble and redundant material shall be removed from site to an appropriately licensed facility.

All disturbed areas where compaction has occurred will be ripped to allow for the growth of vegetation. The area will be shaped and contoured to mimic its surrounding areas and to encourage the recovery and continuity of the wetland vegetation.

6 Policy and Legislative Context

An application for EA in terms of NEMA has been submitted to the DMRE for Listed Activities that were described in Table 5-1. Various policy and legislative requirements are applicable to the EA application and assessment process as detailed in Table 6-1.

Table 6-1: Legislation and Guidelines Applicable to the Proposed Project

Applicable legislation and guidelines used to compile the report	Reference where applied
<p><u>The Constitution of the Republic of South Africa, 1996 (the Constitution)</u></p> <p>Under Section 24 of the Constitution it is clearly stated that:</p> <p><i>Everyone has the right to</i></p> <p><i>(a) an environment that is not harmful to their health or well-being; and</i></p> <p><i>(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -</i></p> <p><i>(i) Prevent pollution and ecological degradation;</i></p> <p><i>(ii) Promote conservation; and</i></p> <p><i>(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</i></p>	<p>TEP is undertaking a BA Process to identify and determine the potential impacts associated with the proposed activities, as well as to ensure all activities undertaken are authorised and lawfully managed against EMPr.</p> <p>Mitigation measures recommended in this report aim to ensure that the potential impacts are managed to acceptable levels to support the environmental rights as enshrined in the Constitution.</p>
<p><u>NEMA and EIA Regulations, 2014 (as amended)</u></p> <p>NEMA, as amended, was set in place in accordance with Section 24 of the Constitution. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment.</p> <p>Section 24 (1)(a) and (b) of NEMA state that:</p> <p><i>The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The EIA Regulations, 2014 (as amended) governs the EA process according to which this project is being undertaken.</p>	<p>The proposed project triggers listed activities in accordance with Listing Notice 1 of the EIA Regulations, 2014 (as amended). The listed activities have been included in Table 5-1.</p> <p>This BAR has been compiled with the environmental management objective to protect ecologically sensitive area and to prevent water pollution and ecological degradation.</p>
<p><u>Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002) (MPRDA)</u></p> <p>The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. The MPRDA ensures that environmental management principles as set out in the NEMA are applied to all mining operations. The MPRDA serves as a guideline for interpretation, administration and implementation of environmental requirements and ensures that mineral resources are exploited in a sustainable manner to serve both present and future generations.</p>	<p>TEP has an approved Mining Right (Ref. No. MP 30/5/1/2/3//2/1(138) EM for the export beneficial plant and coal processes for the TCTS export market. The proposed activities subject to this application are associated with mining-right related activities at TEP; therefore, the provisions set under the MPRDA will be duly complied with.</p>
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999)</u></p> <p>The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority (PHRA), be notified as early as possible of any developments that may exceed certain minimum thresholds.</p>	<p>A heritage assessment was undertaken to determine if any heritage resources would be impacted by the proposed project. It was determined that no heritage resources are located within the proposed project area. Any chance finds will be communicated to SAHRA and the PHRA.</p>
<p><u>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</u></p> <p>The NEM:BA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance:</p> <ul style="list-style-type: none"> • Alien and Invasive Species Lists, 2014 (GN R 599 of 1 August 2014); 	<ul style="list-style-type: none"> • The Wetland Impact Assessment assessed the biodiversity of the area, including Alien Invasive Plants (AIPs), threatened and protected species and the wetland ecosystems; and • The mitigation and management measures to be implemented as part of the proposed project aim to manage and conserve biological diversity, as well as to minimise the spread of alien invasive species.

Applicable legislation and guidelines used to compile the report	Reference where applied
<ul style="list-style-type: none"> National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and National List of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GN R1002 of 9 December 2011). 	
<p><u>The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)</u></p> <p>The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) is to provide control over the utilisation of the natural agricultural resources to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants, and the matters connecting therewith. CARA defines the environmental conservation regulations as the protection of land against soil erosion, the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained.</p>	<p>As part of the construction of the pipeline and pumpstation, a Soil Impact Assessment was undertaken to assess impacts to the soils and its environment. Required mitigation measures have been included to provide control over the natural agricultural resources to promote conservation of the soil, land use and land capability.</p>
<p><u>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)</u></p> <p>The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) seeks to regulate waste management to protect health and environment by providing reasonable measures, including the provision of the remediation of contaminated land. Section 7(2)(d) of the NEM:WA sets the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN R331 of 02 May 2014).</p>	<ul style="list-style-type: none"> The pipeline is proposed to manage contaminated water entering a wetland. The construction of the pipe will however affect the natural biodiversity; and The Soil Impact Assessment was undertaken to assess the soil and its environment of the area and provide remediation measures to improve the soil quality.
<p><u>National Water Act, 1998 (Act No. 36 of 1998)</u></p> <p>Section 21 of the NWA defines a list of water uses which requires a Water Use Authorisation. Listed activities in terms of Section 21 include the following:</p> <ul style="list-style-type: none"> (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (d) engaging in a stream flow reduction activity contemplated in Section 36 of the Act; (e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1); (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. <p>The water uses applicable to the TEP operation and conveyor include Section 21(a), (c), (i) and (g) water uses.</p>	<ul style="list-style-type: none"> An Integrated Water Use Licence Application (IWULA) and an associated Integrated Water and Waste Management Plan (IWWMP) has been prepared as a requirement in terms of Section 21 of the NWA to licenced the associated water uses.

7 Need and Desirability of the Proposed Activities

7.1 Social and Economic Considerations

The proposed project has no socio-economic benefits associated with it; however, the proposed project has an environmental benefit. TEP has already appointed a contractor to construct the pipeline and pump station. No local community members will be employed during the project. The purpose of the project is to minimise the impact of surface water contamination, keeping the costs of pollution/remediation low.

7.2 Environmental Considerations

As part of the BA Process, specialist studies were undertaken, which relate to the physical and biological environmental aspects potentially affected by the proposed project. The objective of these specialist studies is to mitigate, as far as possible, the physical and biological environmental impacts that result from the proposed project activities. It is anticipated that a positive environmental impact to halt the contamination of surface water will occur as a result of the implementation of the proposed project. It is also anticipated that no significant negative impacts will occur during project construction. Additionally, the Mining Right area holds no apparent conservation value, in terms of heritage aspects.

8 Motivation for the Overall Preferred Site, Activities and Technology Alternative

The proposed project is located within the Sasol Secondary Area . For this project, no alternative placement of the infrastructure has been considered. The surrounding area is characterised by anthropogenic activities such as the railway lines, unrehabilitated quarries, and stockpiles. The location of the infrastructure was chosen based on the shortest route for the pipeline to reach the TEP Discard Facility solution trench flowing into the RWD of the TEP Discard facility. The pipeline will be constructed underground as it will cross a wetland. The High-Density Polyethylene (HDPE) pipe will be used for the project, the reason being is strong, durable, flexible, and lightweight. When fused, HDPE offers a zero-leak rate due to the seamless nature of the pipe system. The HDPE pipe offers a more environmentally sustainable footprint because it is non-toxic, corrosion, and chemical resistant, the pipeline has a long lifespan and is suitable for trench installation methods. This is the reason the HDPE pipeline is chosen for the project

9 Full Description of the Process Followed to Reach the Proposed Preferred Alternatives within the Site

9.1 Details of the Development Footprint Alternatives Considered

No alternatives have been identified for the proposed project. The location of the proposed activity is determined by the location of the contamination source. The pipeline will be placed underground as TEP has an existing railway line that is in use and the pipeline cannot cross over as it will impede the railway. This is the best possible short route for the pipeline to pass in order to address the contamination at Wollie se Gat.

The infrastructure to be utilised during the construction phase will not be permanent. An existing road will be utilised to avoid unnecessary impacts on the environment. The temporary site offices will be placed in an already disturbed area. A soil and wetland specialist study were undertaken to determine the potential impacts in the project area and has determined that the project will have a moderate impact on land use and land capability. No significant negative impacts have been identified from the placement of the infrastructure.

10 Details of the Public Participation Process followed

PPP is a legislative requirement in terms of Chapter 6 of the EIA Regulations, 2014 (as amended). The main objective of the PPP is to provide a platform for the applicant, Interested and Affected Parties (I&APs) and relevant organs of state to work together to enable the relevant authorities to make an informed decision on the proposed project. Through the PPP, I&APs can contribute local knowledge and raise comments and concerns applicable to the project planning and design.

For this BA Process, the PPP has been divided into three phases, namely:

- Announcement Phase;
- BA Phase; and
- Decision Making Phase.

10.1.1 Announcement Phase

The proposed project was announced together with availability of Draft BAR for public review. The announcement phase included the activities detailed below.

10.1.2 Identification of Stakeholders

To ensure a proper representation of stakeholders interested in or affected by the proposed project, the following stakeholder identification methods were used to develop a stakeholder database:

- Conducting Windeed and related desktop searches in and around the project area to verify landownership and obtain contact details;

- Responses from newspaper advertisement and site notices;
- Responses on the distribution of the Background Information Document (BID); and
- Telephonic consultations with landowners to identify additional I&APs.

Stakeholders for the proposed project have been grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners:** Directly affected and indirectly affected landowners;
- **Land occupiers:** Directly affected and indirectly affected land occupiers;
- **Communities:** Surrounding communities;
- **Non-Governmental Organisations (NGOs):** Environmental and social organisations;
- **Agriculture:** associations or organisations focussed on agricultural activities; and
- **Business:** small medium enterprises and formal organisations.

10.1.3 Public Participation Documentation

- **BID:** A BID, which included a project description, information about the required legislation, the competent authorities and details of the appointed EAP. The BID also included a registration and comment form for stakeholders to use for formal registration as I&APs or to submit comments. Information regarding the availability of the Draft BAR for public review was also provided;
- **Newspaper advertisement:** A newspaper advertisement was placed in one local newspaper. The advert included a brief project description, information about the required legislation, the competent authorities, details of the appointed EAP, registration process for I&APs and information regarding the availability of the Draft BAR for public review; and
- **Site notices:** Site notices were erected around the Govan Mbeki Local Municipality. The site notices contained a brief project description, information about the required legislation, the competent authorities and details of the EAP, registration process for I&APs and information regarding the availability of the Draft BAR for public review.

10.2 Basic Assessment Phase

The Draft BAR will be available for public review for 30 days on the Digby Wells website from the 30 April 2021 to 31 May 2021 (www.digbywells.com under Public Documents).

Due to the COVID-19 national lock down, the Draft BAR has only been released electronically. To access the report (free of charge/ data-free), please click on the following link: <http://view.datafree.co/PublicDocuments/> or copy the link to your URL or visit our website.

During the BA Phase, engagement with I&APs will take place by means of telephonic consultations to obtain comments. I&APs can submit comments to the Digby Wells

Stakeholder Engagement Office. Comments received will be captured into the Comment and Response Report (CRR).

After the lapse of the 30-day public review period, the Draft BAR will be updated and finalised for submission to the DMRE for consideration. The Final BAR will also be placed on the Digby Wells website and I&APs will be informed of its availability by means of a letter. This will enable I&APs to verify that their comments have been captured and responded to.

10.3 Summary of Public Participation Activities Undertaken to Date

Table 10-1 provides a summary of the PPP activities undertaken to date. Supporting documentation is included in Appendix C.

Table 10-1: Public Participation Activities

Activity	Details	Reference in Report
Identification of stakeholders	A stakeholder database which represents various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area has been compiled.	Appendix C Stakeholder database
Distribution of BID announcement letter	A BID with registration and comment form was emailed to stakeholders on 30 April 2021. An SMS was also sent to stakeholders on 29 April 2021 announcing the availability of the Draft BAR for public review.	Appendix C Public Participation Materials
Placing of newspaper advertisement	A newspaper advertisement was placed in the Ridge Close on 30 April 2021.	Appendix C Public Participation Materials
Site notices	Site notices were erected at the proposed project area and local libraries on 30 April 2021. A site notice placement report and map will be developed to indicate the locations of site notices in and around the project area.	Appendix C Public Participation Materials
Announcement of Draft BAR	Announcement of availability of the Draft BAR was emailed to stakeholders together with the formal project announcement on 30 April 2021. The Draft BAR has been released electronically and copies are available to stakeholders on the Digby Wells website (www.digbywells.com under Public Documents) and can be accessed via our data-free service. Note: Due to COVID-19 Regulations, no documents were placed at public areas.	Appendix C Public Participation Materials

Activity	Details	Reference in Report
	Stakeholders were sent a data-free link where they can access the reports. http://view.datafree.co/PublicDocuments/	
Telephonic engagement	Engagement with directly and adjacent landowners will be done by means of telephonic consultations to obtain comments.	-
Obtaining comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders will be captured in the CRR. The CRR will be appended to the Final BAR, which will be submitted to the DMRE and simultaneously made available to I&APs.	-
Announcement of Final BAR	The Final BAR will be made available on www.digbywells.com (under Public Documents).	-

10.4 Decision Making Phase

Once the competent authority has taken a decision regarding the EA application, all registered I&APs will be notified of the EA decision by SMS, email, letter or fax.

10.5 Summary of Issues Raised by IA&Ps

At the time of making this Draft BAR available for public review, no stakeholder consultation had commenced. Feedback, comments and issues raised by stakeholders during the public review period will be included in the Final BAR and submitted to the DMRE.

11 The Environmental Attributes Associated with the Alternatives

The environmental baseline studies conducted in support of this Draft BAR include:

- Wetland; Impact Assessment
- Heritage Impact Assessment; and
- Rehabilitation Assessment.

Baseline information was also extrapolated from the approved 2010 EMP for the TEP, which is in close proximity to the proposed project area.

A summary of the baseline environment is provided in Sections 11.1 to 11.8.

11.1 Climate

The project area falls under the Moist Highveld Grassland climatic zone (Kruger, 2004). The region is characterised by warm to hot summers and cool to cold winters. Showers and

thunderstorms occur during the summer months (September – April) and the winter months are normally arid and cold (June – August). The maximum temperatures range from 30°C in summer to 17.1°C in winter. The minimum temperatures range from 25.8°C in summer to below 5°C in winter.

Rainfall in the region occurs mainly during the summer months and the average Mean Annual Precipitation (MAP) is 667 mm per annum, with a peak in January. The potential Mean Annual Evaporation (MAE) for the region is in the order of 1 580 mm which is more than twice as much as the MAP for the area and the Mean Annual Runoff (MAR) is 59 mm.

The annual pan evaporation in the area is approximately 1 730 mm with the highest evaporation occurring from October to January. Peak evaporation occurs in December, approximately two times the winter evaporation. The evaporation rates can reach values as high as 6.6 mm/d for the summer months and as low as 2.7 mm/d in the winter months.

11.2 Topography

The TEP lies in a typical Highveld area and drains to the south towards the Vaal River System. The area is characterised by undulating topography of grassland and cultivated fields with surface elevations ranging from 1 590 meters above mean sea level (mamsl) up to 1660 mamsl, as illustrated in Figure 11-1 (Plan 5 in Appendix B). The average slope for the project area is approximately 0.9° to 2.7°, with a small south-eastern region of the project area having an average slope of 2.8° to 4° (Figure 11-2).

11.3 Geology

The project area is dominated by fine-grained felsic rocks located within the Highveld Coalfield, which comprises the coal bearing Vryheid Formation of the Ecca group in the Karoo Supergroup sequence (Johnson, Van Vuuren, Hegenberger, Key, & Shoko, 1996). The Karoo Supergroup is made up of four layers, namely the Drakensburg, Vryheid, Pietermaritzburg and Dwyka Formations. The regional Dwyka Formation consists of diamictite, glaciolacustrine siltstone, pebbly mudstone and fluvio-glacial gravel and conglomerate. The Pietermaritzburg Formation overlies the Dwyka and consists of a thin siltstone bed that is sporadically developed in the Bosjesspruit Mine coal reserve area. The coal is hosted in the Vryheid Formation, which overlies the Dwyka and Pietermaritzburg Formations and forms the main thickness of the Karoo sequence in the Highveld Coalfield (Digby Wells Environmental, 2021). The geology of the area is depicted in Figure 11-3 (Plan 7 in Appendix B).

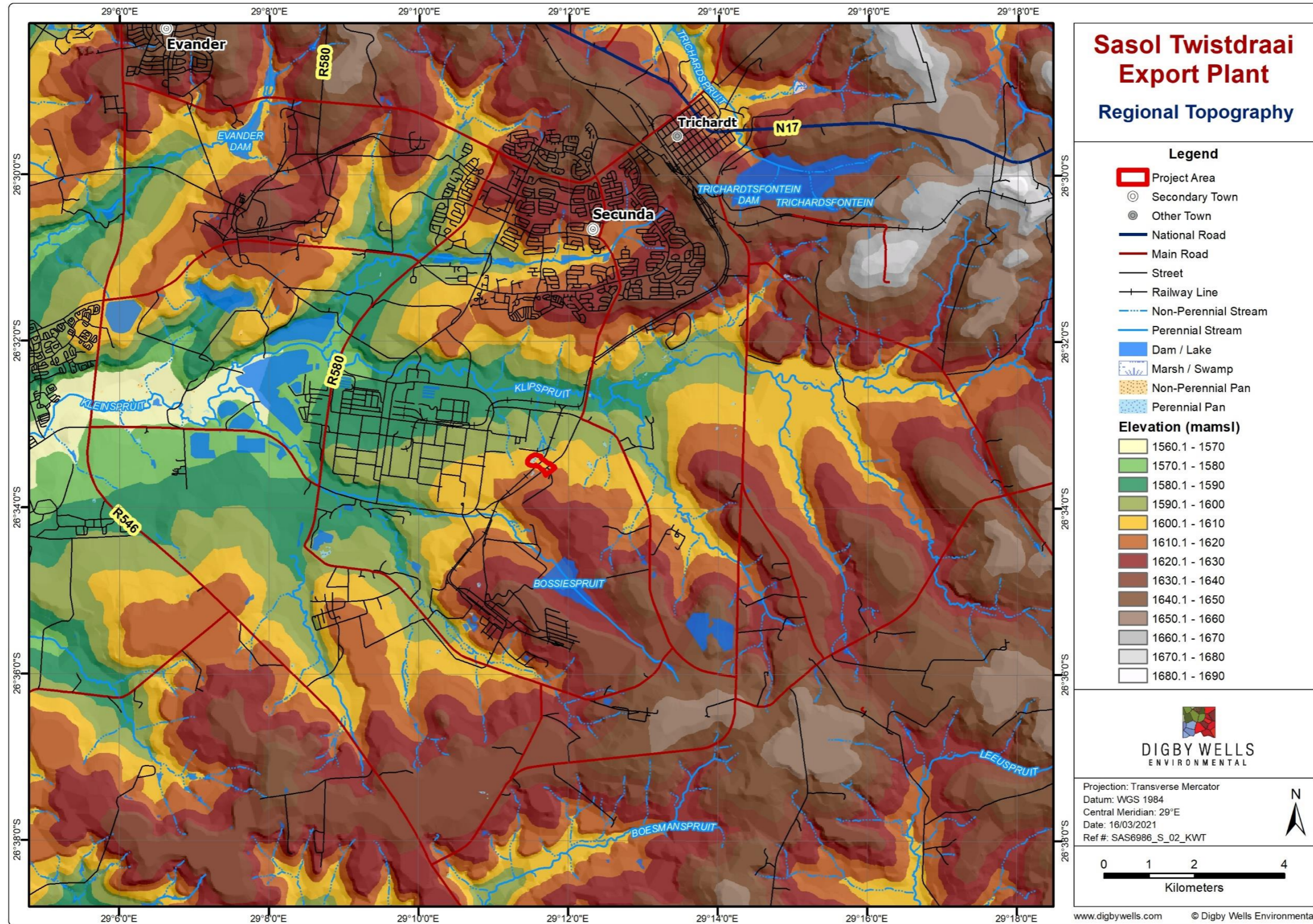


Figure 11-1: Topography of the Project Area

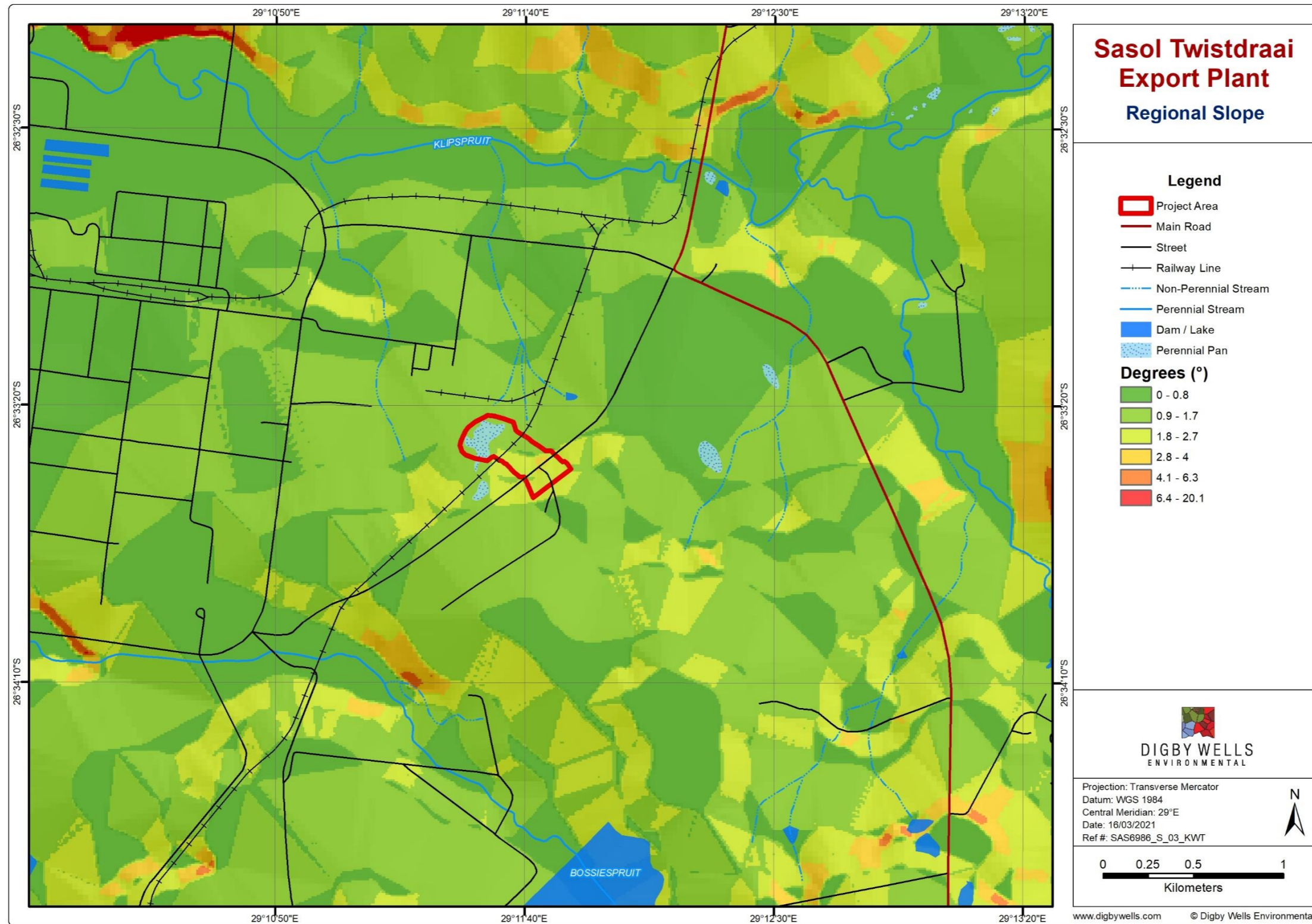


Figure 11-2: Slope of the Project Area

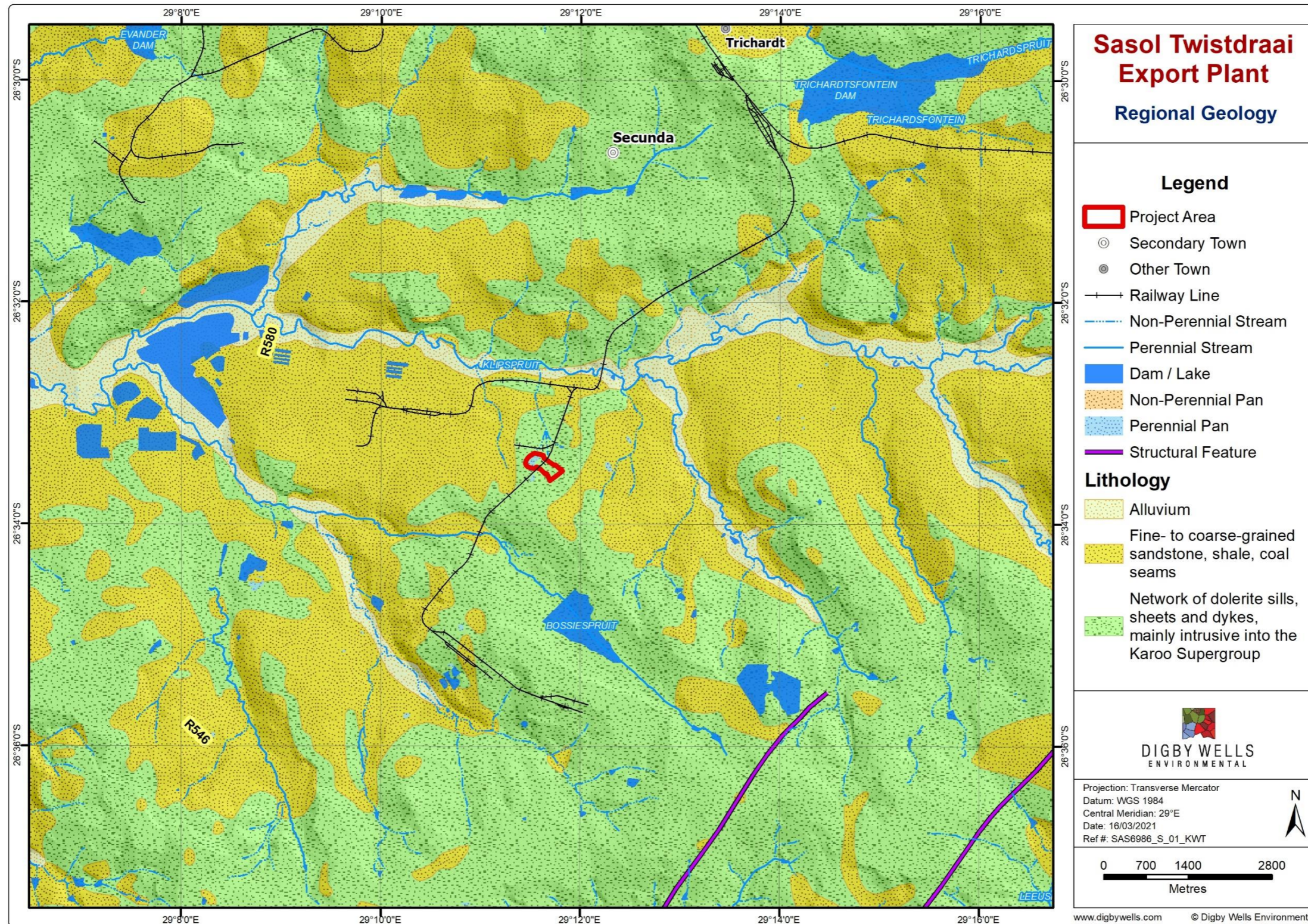


Figure 11-3: Geology of the Project Area

11.4 Soil and Land Capability and Land Use

11.4.1 Soils Forms

The soil forms within the project area are Arcadia, Rensburg and Witbank soil forms. These soils are high in clay content and young in age with observed evidence of emerging soil development in the form of colour variations and clay lamellae. These soils are mainly associated with wetlands and low-lying areas and highly susceptible to erosion. The Witbank soils were a mixture of topsoil, sub-soil and gravel, associated with and impacted by historical mining activities and associated infrastructures such as a conveyor belt, roads and trenches. The soil boundaries were established by augering the area. Refer to Figure 11-4 for augered soils and Figure 11-5 for the location of the auger points. The soils were shallow and heavily disturbed with evidence of excavations, stockpiling and the presence of AIPs.



Figure 11-4: Augered Soils

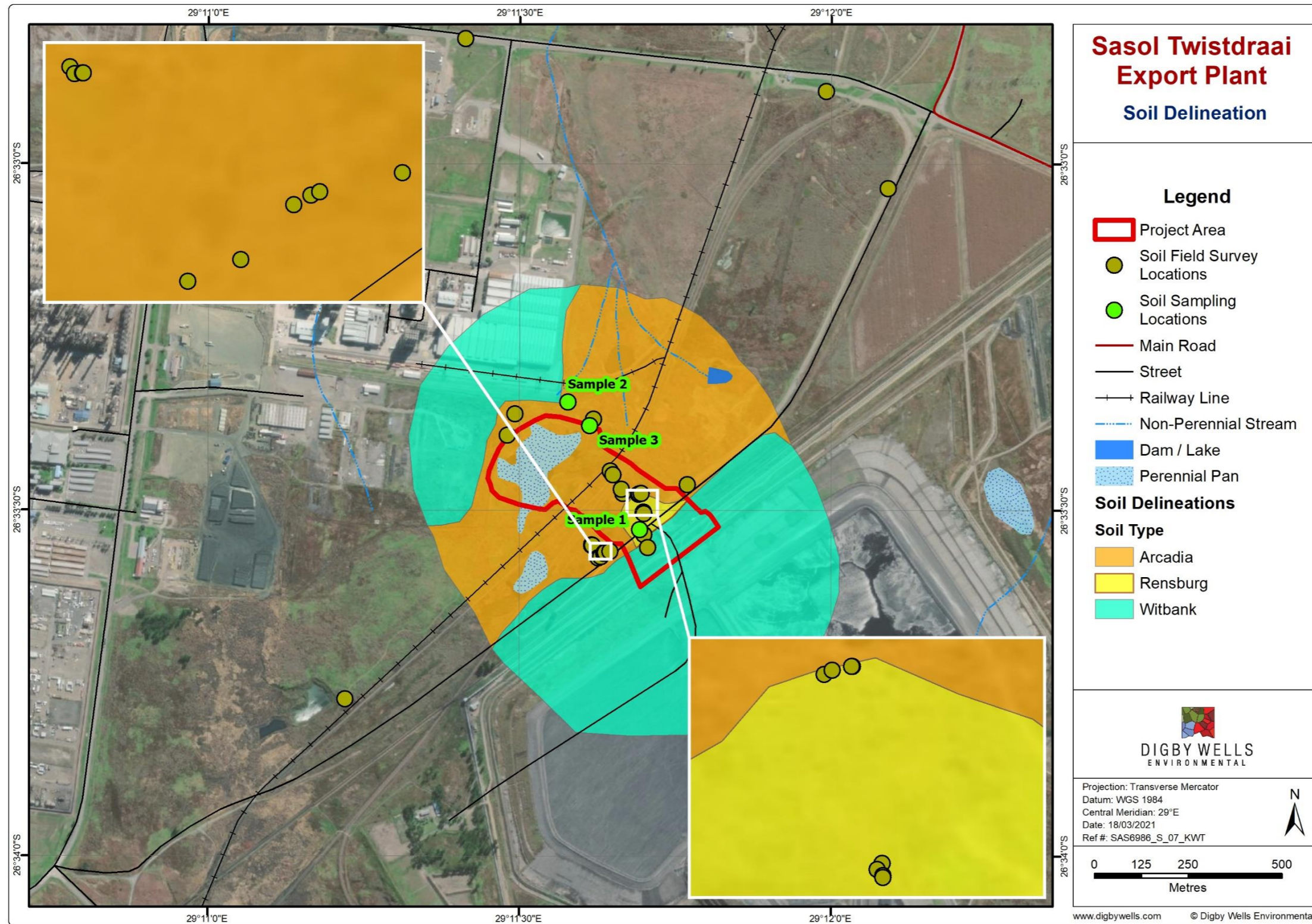


Figure 11-5: Soil Types

11.4.2 Land use

The present land use was identified using satellite images and verified during a rapid site survey. The dominant land use of the project area is mining together with all mining related activities and infrastructure as shown in Figure 11-6. These include:

- Railways;
- Formal and informal roads;
- Fence lines and power lines;
- Dams;
- Mine buildings;
- Conveyor belt;
- Solution trench; and
- Discard Facility.



Figure 11-6: Land use activities

11.4.3 Land Capability

The land capability is determined by assessing the combination of soil, terrain and climate features. The dominant land capability classes in the project area are Class III (Arable Land – Moderate Cultivation/ Intensive Cultivation). A detailed breakdown is given below in Table 11 5.

Table 11-1: Land capability classification of the project area

Land Capability Class	Classification	Dominant Limitation Influencing the Physical Suitability for Agricultural Use
III	Arable Land – Moderate Cultivation/Intensive Cultivation	Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

11.4.4 Flora

The project area falls within the Grassland Biome (Mucina and Rutherford, 2006), one of the nine South African plant biomes and the second most bio-diverse biome in South Africa. The Grassland Biome is situated primarily on the central plateau of South Africa and the inland areas of Kwa-Zulu-Natal and the Eastern Cape Provinces. This biome is rich in flora and fauna diversity but is under threat due to rapid urbanisation and expansion of mining and industrial activities.

The project area occurs in the Soweto Highveld Grassland regional vegetation type (Mucina and Rutherford, 2006). This is depicted in Figure 11-7 (Plan 9 in Appendix B. It is an endangered vegetation type with a conservation target of 24%. Table 11-2 list the plant species characteristic of the Soweto Highveld Grassland.

Table 11-2: Plant species characterised of the Soweto Highveld Grassland

Plant Form	Species
Graminoids	<i>Andropogon appendiculatus</i> , <i>Brachiaria serrata</i> , <i>Cymbopogon pospischilii</i> , <i>Cynodon dactylon</i> , <i>Elionurus muticus</i> , <i>Eragrostis capensis</i> , <i>E. chloromelas</i> , <i>E. curvula</i> , <i>E. plana</i> , <i>E. planiculmis</i> , <i>E. racemosa</i> , <i>Heteropogon contortus</i> , <i>Hyparrhenia hirta</i> , <i>Setaria nigrirostris</i> , <i>S. sphacelata</i> , <i>Themeda triandra</i> , <i>Tristachya leucothrix</i> , <i>Andropogon schirensis</i> , <i>Aristida adscensionis</i> , <i>A. bipartita</i> , <i>A. congesta</i> , <i>A. junciformis</i> subsp. <i>galpinii</i> , <i>Cymbopogon caesius</i> , <i>Digitaria diagonalis</i> , <i>Diheteropogon amplexens</i> , <i>Eragrostis micrantha</i> , <i>E. superba</i> , <i>Harporchloa falx</i> , <i>Microchloa caffra</i> and <i>Paspalum dilatatum</i> .
Herbs	<i>Hermannia depressa</i> , <i>Acalypha angustata</i> , <i>Berkheya setifera</i> , <i>Dicoma anomala</i> , <i>Euryops gilfillanii</i> , <i>Geigeria aspera</i> var. <i>aspera</i> , <i>Graderia subintegra</i> , <i>Haplocarpha scaposa</i> , <i>Helichrysum miconiifolium</i> , <i>H. nudifolium</i> var. <i>nudifolium</i> , <i>H. rugulosum</i> , <i>Hibiscus pusillus</i> , <i>Justicia anagalloides</i> , <i>Lippia scaberrima</i> , <i>Rhynchosia effusa</i> , <i>Schistostephium crataegifolium</i> , <i>Selago densiflora</i> , <i>Senecio coronatus</i> , <i>Vernonia oligocephala</i> and <i>Wahlenbergia undulata</i> .
Geophytic herbs	<i>Haemanthus humilis</i> subsp. <i>hirsutus</i> and <i>H. montanus</i> .
Herbaceous Climber	<i>Rhynchosia totta</i> .

Plant Form	Species
Low shrubs	<i>Anthospermum hispidulum</i> , <i>A. rigidum</i> subsp. <i>pumilum</i> , <i>Berkheya annectens</i> , <i>Felicia muricata</i> and <i>Ziziphus zeyheriana</i> .

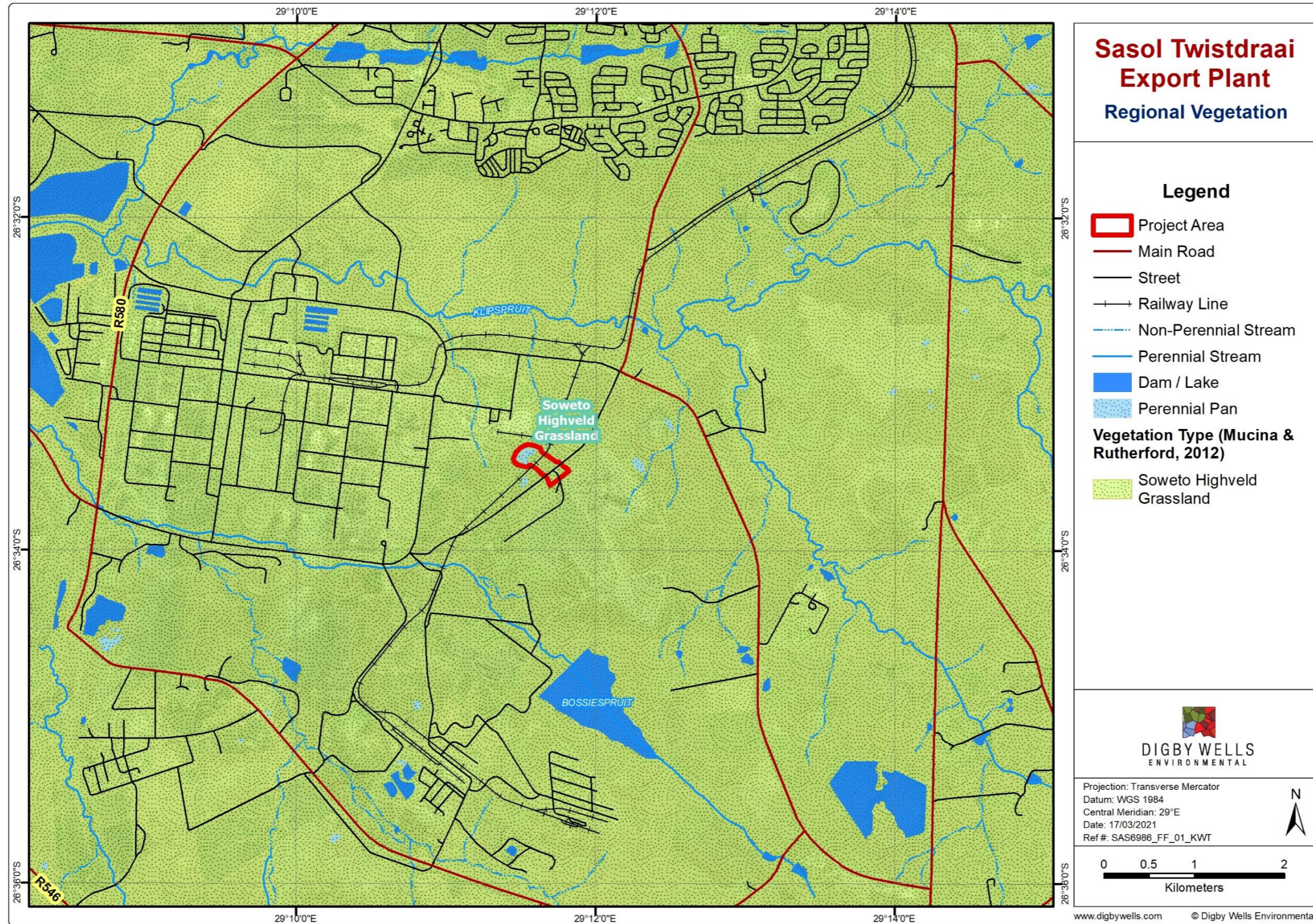


Figure 11-7: Regional Vegetation

11.5 Wetland

The wetlands for the project area were previously delineated (Digby Wells Environmental, 2019) using the accepted methodology from the Department of Water and Sanitation (DWS) (Department of Water Affairs and Forestry, 2005) as well as the “Updated manual for identification and delineation of wetlands and riparian areas” (Department of Water Affairs and Forestry, 2008) which states the four wetland indicators as Soil Wetness Indicators (SWI), Soil Form Indicators (SFI), Vegetation Indicators and Terrain Unit Indicators (TUI).

The wetland delineations were assumed to be accurate and correct and were not reassessed during the 2021 site visit. Some wetland indicators observed during the 2021 rapid site survey are presented in Figure 11-8 below.

Figure 11-9 illustrates the wetland delineations for the project area. The Unchannelled Valley Bottom (UVB) wetland cover approximately 6.28 ha which amounts to 51% of the total 12.41 ha project area.





	
<p>SFI – Arcadia and Rensburg soil forms</p>	<p>SWI – Mottles and gleying</p>
	
<p>Obligated wetland species – <i>Cynodon dactylon</i>, <i>Sedge sp.</i> and <i>Pennisetum sp.</i></p>	<p>TUI – UVB wetland</p>

Figure 11-8: Wetland Indicators

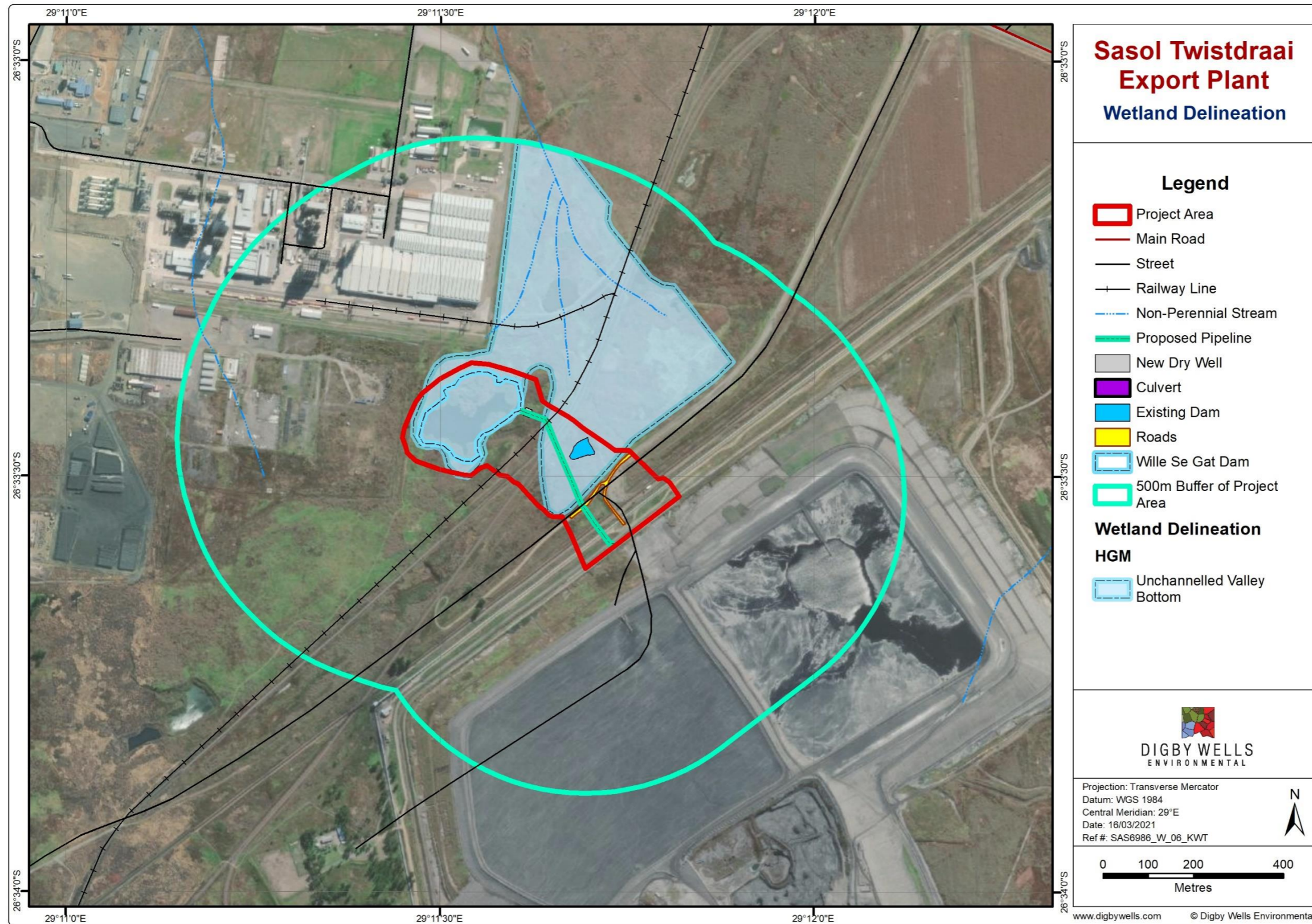


Figure 11-9: Wetland Delineation of the Project Area

11.5.1 Wetland Ecological Health Assessment

The wetland Present Ecological State (PES) of the Hydro-geomorphic (HGM) unit was assessed according to its hydrology, geomorphology and vegetation functionality and health. The PES scores were compared to the previously conducted assessment (Digby Wells Environmental, 2019) to determine whether the wetlands health improved, stabilised, or deteriorated. The land use of the area directly impacts the PES of each HGM unit. The wetlands have been altered from their natural state as the area has been largely transformed.

The UVB HGM unit was considered to have a PES of E during both the 2019 and 2021 assessments (Table 7 2). According to the integrity (health) method described by Kotze et al. (2009) a Category E (serious) wetland has undergone changes in the ecosystem processes and large losses of natural habitat and biota; however, some remaining natural habitat features are still recognisable.

Table 11-3: Wetland Ecological Importance and Sensitivity Score

Analysis Date	HGM Unit	Hydrological Health Score	Geomorphological Health Score	Vegetation Health Score	Final PES	PES Category
2021	UVB	27	5.7	15.6	6.9	E
2019	UVB	-	-	-	-	E

Wetlands are important ecosystems and include various wetland habitat types, such as grassland, open water and seepage areas. The ecological functioning of these ecosystems is directly linked to their position in the landscape as well as their ecological condition. Wetlands of the Grassland biome represent important ecosystems providing many goods and services to people and biodiversity in general. However, this does lead often to over exploitation of these systems which compromises their ecological integrity.

11.5.2 Wetland Ecosystem Services (WET-EcoServices)

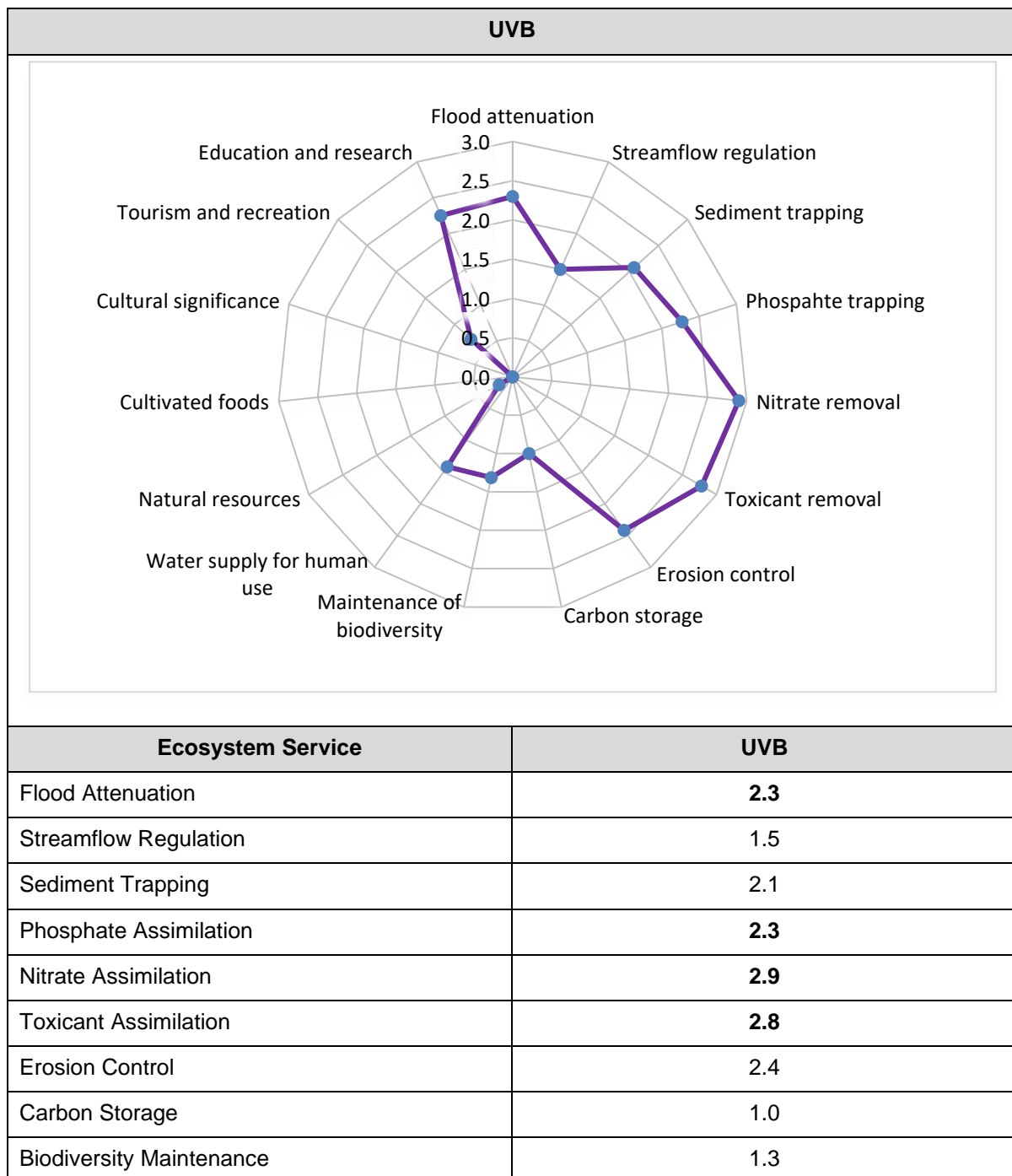
The general features of the UVB were assessed in terms of functioning and the overall importance at a landscape level. Table 11-4 represents the radial plot showing the relative importance of each Ecosystem Service (ES) and a summary of the scores obtained. The ESs' were not assessed during the 2019 assessment and could therefore not be compared to previous data.

The ESs' of the UVB were rated as Moderate. The dominant services provided by the UVB are indicated in bold in the table below and includes:

- Flood attenuation;

- Phosphate assimilation;
- Nitrate assimilation;
- Toxicant assimilation; and
- Education and Research.

Table 11-4: EcoServices radial plots and scores obtained for each HGM unit



UVB	
Water Supply	1.4
Harvestable Resources	0.2
Cultivated Foods	0.0
Cultural Value	0.0
Tourism and Recreation	0.7
Education and Research	2.3
SUM	23.1
Average Score	1.5
Category	Intermediate

11.5.3 Ecological Importance and Sensitivity

The ecological importance of a wetland is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. On the other hand, ecological sensitivity refers to the wetland's ability to resist disturbance and its capability to recover from disturbance that has occurred (Department of Water Affairs and Forestry, 1999).

Table 11-5 indicates the Ecological Important and Sensitivity (EIS) scores for the 2019 and 2021 assessments.

Table 11-5: Wetland Ecological Importance and Sensitivity Scores

Analysis Date	HGM Unit	Ecological Importance & Sensitivity	Hydrological/Functional Importance	Direct Human Benefits	Final EIS	EIS Category
2021	UVB	1.3	2.0	0.8	2.0	Moderate
2019	UVB	-	-	-	-	Moderate

The UVB were measured as Moderate during both assessments due to its hydrological and functional importance.

The wetland is important in flood attenuation, phosphate assimilation, nitrate assimilation and toxicant assimilation. The wetland also provides habitat for various animals, such as birds, rodents and small mammals (Figure 11-10). Evidence (i.e., faeces and discussions with the client) was seen of the possible occurrence of Serval Cats and Tyto sp. (owl species). Serval Cats (*Leptailurus serval*) are rated as Near Threatened according to the South African National Biodiversity Institute (SANBI) and listed as a Threatened or Protected Species (TOPS) according to Endangered Wildlife Trust (EWT).





	
<p>Possible Serval Cats (<i>Leptailurus serval</i>) signs</p>	<p>Presence of <i>Tyto</i> sp. (owl species)</p>
	
<p>Presence of <i>Bovidae</i> species</p>	<p>Presence of <i>Hystricida</i> Sp. (porcupine)</p>

Figure 11-10: Animal Activity within the wetland

11.6 Heritage

Heritage resources do not exist in isolation to the greater natural and social environment, including the socio-cultural, socio-economic and socio-political environments. In addition, the NHRA requires the grading of heritage resources in terms of national, provincial and local concern based on their importance and consequent official (i.e., State) management effort required. The type and level of baseline information required to adequately predict heritage impacts varies between these categories. Digby Wells defined three nested study areas for the purposes of this study:

- The *site-specific* study area: the farm portions extent associated with the pipeline and associated infrastructure, including a 500 m buffer area. The site-specific study area may extend linearly, in which case the site-specific study area will include the linear development and a 200 m buffer on either side of the footprint;
- The *local study area*: the area most likely to be influenced by any changes to heritage resources in the Project area or where Project development could cause heritage impacts. Defined as the area bounded by the local municipality, in this instance GMLM, with particular reference to the immediate surrounding properties and/or farms. The

local study area was specifically examined to offer a backdrop to the socio-economic conditions within which the proposed development will occur. The local study area furthermore provided the local development and planning context that may contribute to cumulative impacts; and

- The *regional study area*: the area bounded by the district municipality, which here is the Gert Sibande District Municipality (GSDM). Where necessary, the regional study area may be extended outside the boundaries of the district municipality to include much wider regional expressions of specific types of heritage resources and historical events. The regional study area also provided the regional development and planning context that may contribute to cumulative impacts.

The cultural heritage baseline description below considers these three study areas

11.6.1 Secondary Data Sources

Table 11-6 presents all other data sources consulted to inform this Notification of Intent to Develop (NID), including sources for historical imagery. The unpublished reports listed in Table 11-6 were sourced from the South African Heritage Resources Information System (SAHRIS).

Table 11-6: Secondary data sources

Databases		
University of the Witwatersrand Archaeological Database (Archaeological Site Database, 2010)		
Genealogical Society of South Africa database (Google Earth Cemetery Initiative, 2011)		
SAHRIS Cases		
Case ID 5472	Case ID 1724	Map ID 672
Case ID 9404	Case ID 1487	Map ID 710
Case ID 1277	Case ID 4309	Map ID 1025
Case ID 12164	Map ID 659	Map ID 719
Case ID 6251	Map ID 719	Map ID 655
Case ID 1722	Map ID 622	Map ID 756

11.6.2 Primary Data Collection

The heritage specialist undertook a pre-disturbance survey of the site-specific study area on 11 March 2021. The pre-disturbance survey focused on the area that was accessible and which was affected by the proposed pipeline. The proposed project area includes a wetland, which was not surveyed. The survey was predominantly pedestrian, but the existing gravel road was surveyed by vehicle.

The pre-disturbance survey was non-intrusive (i.e., no sampling was undertaken) with the aim to:

- Visually record the current state of the cultural landscape; and
- Record a representative sample of the visible, tangible heritage resources present within the development footprint area, site-specific study area and greater study area.

Identified heritage resources were recorded as waypoints using a handheld GPS device. The heritage resources were also recorded through written and photographic records. Figure 11-12 presents the results of the pre-disturbance survey.

11.6.3 Regional Cultural Heritage Baseline

Mpumalanga's geological history takes place over 3 600 million years (Johnson, Anhaessler, & Thomas, 2006; Groenewald & Groenewald, 2014). The province is underlain by valuable geological formations, both in terms of mineral and fossil wealth. Briefly, these comprise:

- The Karoo Supergroup;
- The Bushveld Complex; and
- Transvaal Supergroup.

The regional and local study areas comprise a part of the Highveld Coalfield, which extends across approximately 7 000 km². The Main Karoo Basin is the predominant geological feature to underlie this area. The Main Karoo Basin comprises the lithostratigraphic units associated with the Karoo Supergroup, which dates to the Late Carboniferous to Middle Jurassic periods (between ~320 and 145 million years ago [mya]).

Within the Karoo Supergroup, the sediments of the Ecca Group are the most paleontologically sensitive of the geological layers. The Ecca Group dates to the Permian Period and overlies the Dwyka Formation. The Ecca Group dates to the Permian Period and overlies the Dwyka Formation. The Ecca Group sediments are well-known for the wealth of plant fossils, characterised by assemblage of the *Glossopteris* flora (plant species which occur together and are typified by the dominant fossil leaves that belong to the glossopterid group). These layers also contain significant coal reserves (Groenewald & Groenewald, 2014).

Formations within the Ecca Group include:

- The *Pietermaritzburg Formation*, which rarely forms good outcrops and fossils are rare and difficult to find. This formation is of moderate palaeontological sensitivity;
- The *Vryheid Formation*, which is the main coal-producing formation in South Africa. This formation has produced a number of fossils, including extensive *Glossopteris* assemblages. Other fossils reported from this formation include trace fossils, rare insects, possible conchostracans (bivalve crustaceans and shrimp clams, which are presently still extant), non-marine bivalves and fish scales; and
- The *Volksrust Formation*: monotonous sequence of grey shale. Fossils are significant but rare and include temnospondyl amphibian remains, invertebrates and minor coal

with plant remains, petrified wood and trace fossils assemblages (Groenewald & Groenewald, 2014).

The site-specific study area is associated with Karoo dolerites and the *Vryheid Formation* (Rubidge, 2008; Rubidge, 2013a; Rubidge, 2013b). The Karoo dolerites are intrusive diatremes classified as plutonic igneous rocks. These features include no fossiliferous material and their palaeo-sensitivity is negligible (Rubidge, Palaeontological Scoping Report - Dolerite burrow pits Sasol Mining (Pty) Ltd, 2013a; Palaeontological Scoping Report - Sasol Shondoni conveyor, 2013b; SAHRA, 2013). The Karoo dolerite suite is therefore not considered further in this report.

The *Vryheid Formation* has a very-high palaeo-sensitivity (SAHRA, 2013) and is the primary potential fossil-bearing layer underlying the site-specific study area. The formation corresponds to the basal unit of the Ecca Group, which was deposited roughly 280 mya in a deltaic environment. Shales, sandstones, mudstones and coal feature all form part of this formation (Bamford, Environmental Authorisation for the Proposed Imvula Mine: Palaeontological Impact Assessment addendum to the Heritage Impact Assessment, 2016).

Coal is formed through compression and heat alteration of plant matter. During the formation of coal, alteration happens to such an extent that potential plant fossil remains are no longer recognisable. The shales between the coal horizons, however, have the potential to preserve very good examples of plant fossils (Bamford, Best Practice for Palaeontological Chance Finds: Proposed extension into adjacent Block 4 reserve of Syferfontein Mine (Sasol), Mpumalanga, 2014; Environmental Authorisation for the Proposed Imvula Mine: Palaeontological Impact Assessment addendum to the Heritage Impact Assessment, 2016). To a lesser extent, the sandstone surface outcrops may also preserve fossil plants. Common fossil plants that could be expected within the *Vryheid Formation* include *Glossopteris* leaves, roots and inflorescences; and *Calamites* stems. Coal deposits can potentially also include fossils of mammal-like reptiles and amphibians. These are however, rarely, if ever, preserved with plant fossils (Bamford, Palaeontological Impact Assessment for Majuba Underground Coal Gasification Project, Mpumalanga, 2012; Environmental Authorisation for the Proposed Imvula Mine: Palaeontological Impact Assessment addendum to the Heritage Impact Assessment, 2016).

Table 11-7: Archaeological periods in Mpumalanga, adapted from Esterhuysen & Smith (2007)

The Stone Age	Earlier Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era ¹)
There appears to be a gap in the record in Mpumalanga between approximately 7000 and 2000 BCE.		
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period²	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

The reviewed literature included no reports of archaeological material representing the ESA or EFC periods. As such, these will not be described further in this report. Figure 11-11 provides a breakdown of the cultural heritage resources identified through the literature. The cultural landscape comprises of the historical built environment and burial grounds and graves, although the MSA, LSA and LFC periods are also represented. The reviewed literature also included references to palaeontologically significant material.

¹ Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD); i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

² The author acknowledges that in southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented and is being explored through the 500 year initiative (Swanepoel, et al., 2008).

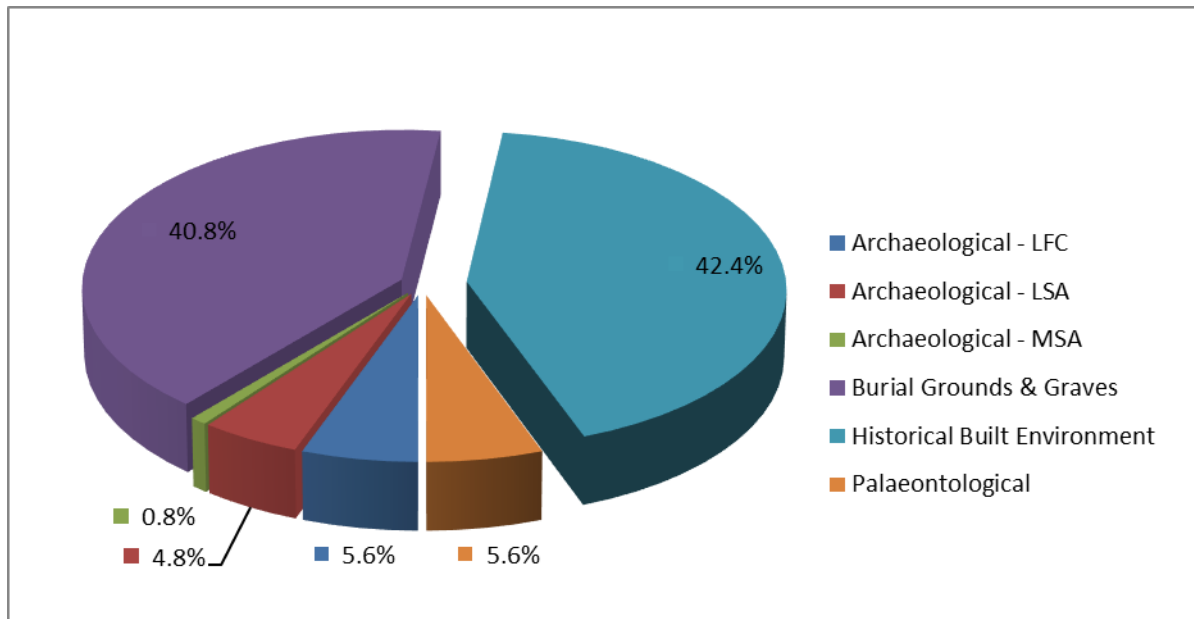


Figure 11-11: Cultural Heritage Resource identified within the Study Area under consideration

11.6.4 Results of the Pre-disturbance Survey

The pre-disturbance survey focused on the area that was accessible and which was affected by the proposed pipeline and excluded the area comprising the wetland adjacent to Wollie se Gat. Refer to Figure 11-13 and Plan 11 in Appendix B.

The survey was recorded as GPS tracks and identified heritage resources were marked as waypoints. Identified heritage resources were also recorded through written notes and photographs.

The following sections describe the observations made during the survey and the outcomes of the survey.

11.6.4.1 Existing Environment

The existing environment comprises the Wollie se Gat flooded quarry and the adjacent wetland. The area surrounding these features has been extensively disturbed by anthropogenic activity associated with the TEP and other operations within the SSO secondary area. These disturbances include the TEP Discard Facility, culverts, railway lines (operational and defunct), the existing gravel road and coal conveyors to transport the coal to the TEP for processing.

At the time of the pre-disturbance survey, much of the area earmarked for the pipeline had been cleared. Sasol Mining had cleared the area to investigate for underlying pipelines and other infrastructure to confirm the suitability of the area for the pipeline. Figure 11-12 presents an overview of the site-specific study area at the time of the pre-disturbance survey.



Figure 11-12: Results of the Pre-disturbed Survey showing the Existing Environment

11.6.4.2 Newly identified Heritage Resources

No heritage resources were identified during the pre-disturbance survey. This is likely due to the history of disturbance within the site-specific study area as well as the presence of the wetland, which comprises a large portion of the site-specific study area.

The pre-disturbance survey was led by two representatives of TEP. Neither was aware of any heritage resources in proximity to the project area.

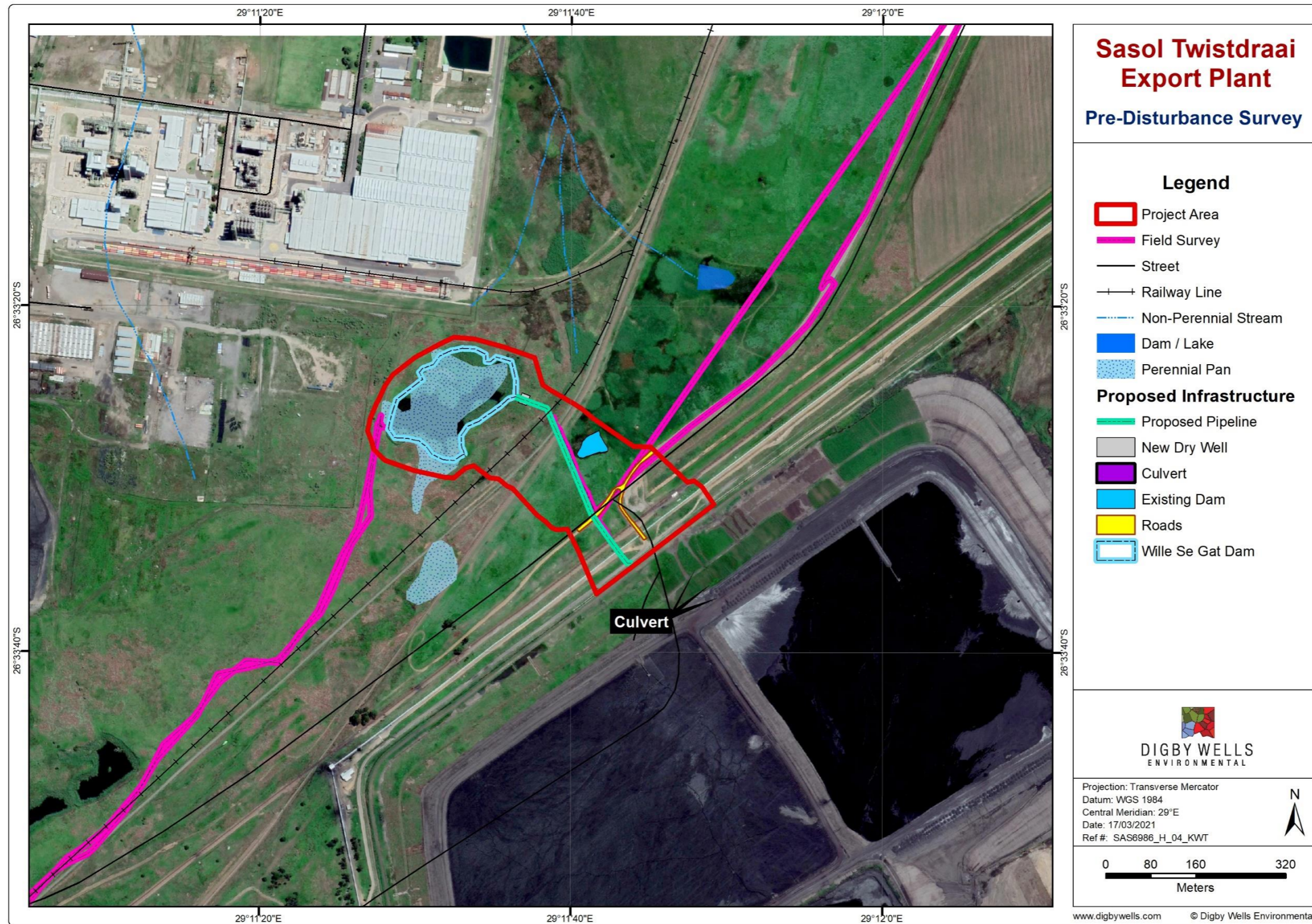


Figure 11-13: Results of the Pre-disturbance Survey

11.7 Description of the Current Land Uses

The proposed project is located within TEP area. The area is already disturbed. Wollie se Gat, an old quarry that was established in the early 1980s during the construction of the Sasol 2 and Sasol 3 Synfuels Plants infrastructure and was subsequently used as a dumping area for construction rubble and associated debris. This quarry has since filled with water and is prone to overflowing in heavy and/or extended rainfall events. A wetland occurs in proximity to Wollie se Gat. The area has also been impacted upon by roads, discard disposal facility dumps and other mining related activities.

The general project area (including outside the borders of the project area) includes coal discard and fine coal disposal facilities, and quarries with associated industrial. A land use map has been included in Figure 11-14 (Plan 12 in Appendix B).

11.8 Description of Specific Environmental Features and Infrastructure on the Site

The project area is dominantly surrounded by a wetlands; however, no heritage resources are present within the footprint. No infrastructure is currently located onto the project area footprint.

The infrastructure proposed to be utilised for the project includes construction of a pipeline and pumpstation, temporary site offices, parking areas and upgrading of access roads. Minimal infrastructure will be constructed and all machinery will be mobile.

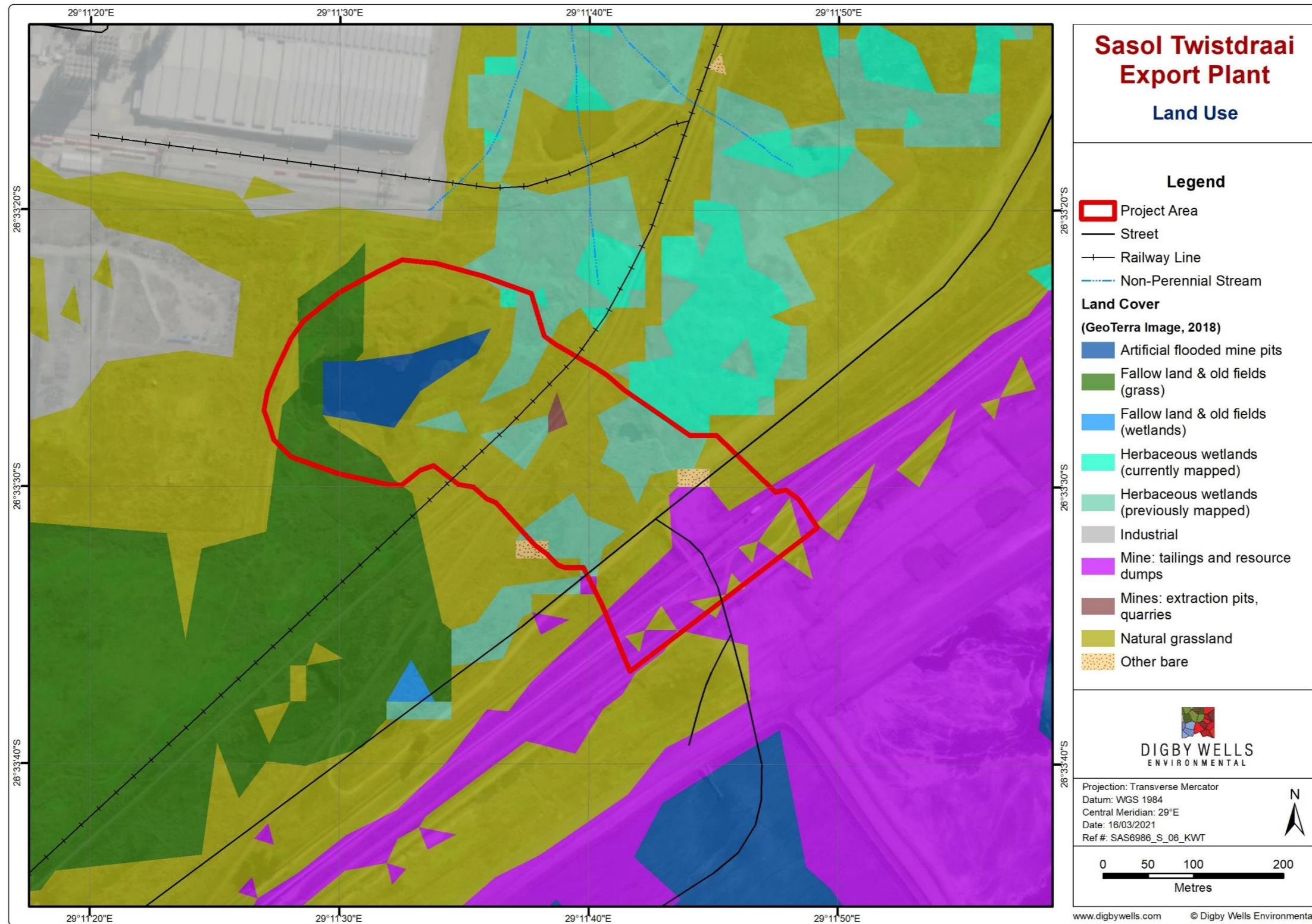


Figure 11-14: Land Uses of the Project Area

12 Impacts and Risks Identified including the Nature, Significance, Consequence, Extent, Duration and Probability of the Impacts

The potential impacts are discussed according to each phase of the proposed project, namely the establishment, operational and rehabilitation phases. The proposed project activities are summarised in Table 12-1.

This section also rates the significance of the potential impacts pre-mitigation and post-mitigation. The impacts below are a result of the environment in which the activity takes place, as well the activity itself. The methodology utilised to assess the significance of the potential impacts is described in Section 12.1.

Table 12-1: Summary of Project Activities

Activity No.	Activity
Construction Phase	<ul style="list-style-type: none"> • Removal of vegetation/topsoil; • Establishment of access road-upgrade of an existing two spoor track; • Construction of a pipeline and pump station; and • Establishment of laydown area and contractor's offices
Operational Phase	<ul style="list-style-type: none"> • Operation of a pipeline and pump station.
Decommission and Rehabilitation Phase	<ul style="list-style-type: none"> • Dismantling and removal of pipeline and pump station; and • Rehabilitation (topsoil cover, ripping and vegetation establishment).

12.1 Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks

The methodology used to assess the significance of potential ecological and heritage impacts is described below. The significance rating formula is as follows:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

$$\text{Consequence} = \text{Type of Impact} \times (\text{Intensity} + \text{Spatial Scale} + \text{Duration})$$

And

$$\text{Probability} = \text{Likelihood of an Impact Occurring}$$

In addition, the formula for calculating consequence:

Type of Impact (Nature) = +1 (Positive Impact) or -1 (Negative Impact)

The weight assigned to the various parameters for positive and negative social and heritage impacts is provided for in the formula and is presented in Table 12-2. The probability consequence matrix for social and heritage impacts is displayed in Table 12-3, with the impact significance rating described in Table 12-4.

Table 12-2: Impact Assessment Parameter Ratings

Rating	Intensity / Replaceability		Extent	Duration/Reversibility
	Environmental	Social, Cultural and Heritage		
7	<p>Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage.</p> <p>The positive impact will result in a significant improvement to the initial/post disturbance environmental status and will benefit ecological and natural resources.</p>	<p>Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.</p> <p>The positive impact will be of high significance which will result the improvement of the socio-economic status of a greater area beyond the boundary of the directly affected of the community and/or promote archaeological and heritage awareness and contribute towards research and documentation of sites and artefacts through phase two assessments.</p>	<p>International</p> <p>The effect will occur across international borders</p>	<p>Permanent: The impact is irreversible, even with management, and will remain after the life of the project</p>
6	<p>Significant impact on highly valued species, habitat or ecosystem.</p> <p>The positive impact is of high significance which will result in a vast improvement to the environment such as ecological diversification and/or rehabilitation of endangered species</p>	<p>Irreparable damage to highly valued items of cultural significance or breakdown of social order.</p> <p>The positive impact will be of high significance and will result in the upliftment of the surrounding community and/or contribute towards research and documentation of sites and artefacts through phase two assessments</p>	<p>National</p> <p>Will affect the entire country</p>	<p>Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management</p>
5	<p>Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate</p> <p>The positive impact will be moderately high and will have a long-term beneficial effect on the natural environment</p>	<p>Very serious widespread social impacts. Irreparable damage to highly valued items</p> <p>The positive impact will be moderately high and will result in visible improvements on the socio-economic environment of the local and regional community, and/or promote archaeological and heritage awareness through mitigation</p>	<p>Cercle/ Region</p> <p>Will affect the entire Cercle or region</p>	<p>Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management</p>
4	<p>Serious medium-term environmental effects. Environmental damage can be reversed in less than a year</p> <p>The positive impact on the environment will be moderate with visible improvement to the natural resources and regional biodiversity</p>	<p>On-going serious social issues. Significant damage to structures / items of cultural significance</p> <p>The positive impact on the socio-economic environment will be of a moderate extent and benefits should be experience across the local extent and/or potential benefits for archaeological and heritage conservation</p>	<p>Commune Area</p> <p>Will affect the whole municipal area</p>	<p>Long term: 6-15 years and impact can be reversed with management</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility
	Environmental	Social, Cultural and Heritage		
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month. The positive impact will be moderately beneficial to the natural environment but will be short lived.	Ongoing social issues. Damage to items of cultural significance. The positive impact will be moderately beneficial for some community members and/or employees, but will be short lived and/or there will be a moderate possibility for archaeological and heritage conservation	Local Local extending only as far as the development site area	Medium term: 1-5 years and impact can be reversed with minimal management
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. The positive impacts will be minor and slight environmental improvement will be visible.	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected. Minor positive impacts on the social/cultural and/ or economic environment	Limited Limited to the site and its immediate surroundings	Short term: Less than 1 year and is reversible.
1	Limited damage to minimal area of low significance, (e.g. ad hoc spills within plant area). Will have no impact on the environment. The positive impact on the environment will be insignificant and will not result in visible improvements	Low-level repairable damage to commonplace structures. The positive impact on social and cultural aspects will be insignificant	Very limited Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.

Table 12-3: Probability/ Consequence Matrix

Probability	Significance																																					
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table 12-4: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe effects	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects	Major (negative)

12.2 Construction Phase

The Construction Phase for the project area includes the removal of vegetation and topsoil for the construction of a pipeline and pump station. The existing two-spoor tracks will be upgraded.

12.2.1 Soil, Land use and Land Capability

The impacts associated with soil and land capability during the Construction Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-5.

Table 12-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Construction Phase

1. Activity and Interaction: Development and upgrading of a permanent access road to the site.			
Impact:			
<ul style="list-style-type: none"> • Soil compaction; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Soil erosion (surface erosion, head cut erosion) and sediment release to wetlands; • Alteration of topographies; and • Soil contamination from spills and leakages. 			
Description:			
<p>Due to the high erodibility and clayey nature of the soils, the construction activities for the proposed infrastructure may lead to erosion, head-cut erosion, compaction, increased surface runoff and changes to the natural geomorphology and fertility of the soils. Roads crossing wetland systems may lead to erosion and new channel formation that may lead to sedimentation and loss of vegetation. The clayey soils have various restrictions to vegetation and when not managed, the disturbances may lead to proliferation of AIPs.</p> <p>The high clay content soils may lead to infrastructure collapsing, cracking and other construction risks.</p>			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Permanent (7)	The road will be permanent, thus permanent loss of soil/land use.	Moderate (negative) - 84
Extent	Local (3)	Impact will only be on site and immediate surroundings.	
Intensity	Minor Loss (2)	Due to the area being very impacted already, the intensity will be moderate.	

Probability	Definite (7)	The road will definitely be built, and soil be lost/compacted/eroding.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Only the designated access routes are to be used to reduce any unnecessary compaction; • Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential); • Unused roads must be rehabilitated to prevent hardened surfaces; and • Implement a stormwater management plant to prevent impacts from the roads to the soils (erosion, head-cut erosion, increased runoff, loss of soil, water ponding). 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Beyond Project Life (6)	The road will be permanent, however if managed, impacts will not be permanent.	Minor (negative) - 40
Extent	Limited (2)	Impact will only be on site if mitigated and managed.	
Intensity	Minor Loss (2)	Due to the area being very impacted already, the intensity will be minor.	
Probability	Probable (4)	The road will definitely be built, however, impacts less when mitigation measures are followed and there is already established roads that could be used.	
Nature	Negative		
2. Activity and Interaction: Clearing and grubbing of approximately 0.3 ha.			
Impact:			
<ul style="list-style-type: none"> • Soil compaction and topsoil loss leading to reduced fertility; • Soil erosion (and sediment release to wetlands); and • Alteration of natural drainage lines and topographies. 			
Description:			

During the construction phase, site clearing is necessary for the preparation of surface infrastructure where vegetation will be removed along with topsoil. When soil is removed, the physical and chemical properties are changed and the soils will deteriorate unless properly managed. When the organic material is removed, either by the clearing of an area for development of infrastructure or by erosion; the soil fertility status is reduced and may result in soil acidification. Vehicles will drive on the soil surface during the construction phase, thereby causing compaction. This reduces infiltration rates and the ability for plant roots to penetrate the compacted soil. The loss of vegetation cover will exacerbate runoff potential that may lead to increased erosion as well as the loss of organic material.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Project Life (5)	Site clearing should take place during construction but the impact last for the long term without mitigation.	Minor (negative) - 65
Extent	Local (3)	Impact will only be in small areas of the Project Area.	
Intensity	Serious Loss (5)	Impacts might be serious when mitigation is not followed. The soils have a high susceptibility to erosion.	
Probability	Likely (5)	Impacts will likely occur without mitigation.	
Nature	Negative		

Mitigation Measures

- If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place;
- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- Bush clearing contractors will only clear bushes and trees larger than 0.5 m the remaining vegetation will be stripped with the top 300 mm of topsoil (usable soil) to conserve as much of the nutrient cycle, organic matter and seed bank as possible;
- The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly;
- Compaction of the removed and stockpiled usable soil must be avoided by prohibiting traffic on stockpiles;
- Stockpiles should only be used for their designated final purposes; and

Post-Mitigation

Dimension	Rating	Motivation	Significance
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Duration	Medium Term (3)	Site clearing should only take place during construction and impacts should not be longer than 1 year when managed and mitigated.	Negligible (negative) - 28
Extent	Limited (2)	Impact will only be in a small section, if any when mitigation is followed.	
Intensity	Minor Loss (2)	Due to the area being very impacted already, the intensity will be minor.	
Probability	Probable (4)	It is probable that impacts will occur, even though mitigation measures are followed. Soils will be stripped and cleared of vegetation.	
Nature	Negative		
3. Activity and Interaction: Establishment of the laydown area and contractor's camp.			
Impact:			
<ul style="list-style-type: none"> • Soil compaction; • Soil erosion and sedimentation; and • Soil contamination. 			
Description:			
The laydown area adjacent to the TEP will create hardened surfaces that will lead to increased runoff, erosion and sedimentation of the wetlands.			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	Construction should only take place during construction but the impact last for the medium term without mitigation.	Minor (negative) - 36
Extent	Local (3)	Impact could extend beyond the immediate area.	
Intensity	Moderate Loss (3)	Impacts could be serious and cause loss of soil, soil fertility and biodiversity.	
Probability	Probable (4)	Impacts are probable to occur without mitigation.	
Nature	Negative		
Mitigation Measures			

- If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place;
- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- Ensure proper storm water management designs are in place;
- Only the designated access routes are to be used to reduce any unnecessary compaction; and
- Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential).

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Construction should only take place during construction and the impact only for a short while when mitigation is followed.	Negligible (negative) - 28
Extent	Limited (3)	Impact should only take place at the area and not beyond.	
Intensity	Minor Loss (2)	Impacts should be minor when mitigation is followed.	
Probability	Probable (4)	Impacts are still probably going to occur even though mitigation is followed.	
Nature	Negative		

4. Activity and Interaction: Construction of the pump station and the pipeline from the pump station to the TEP Discard Disposal Facility solution trench.

Impact:

- Removal of the soil changing the natural geomorphology;
- Soil erosion and sedimentation;
- Soil compaction and topsoil loss leading to reduced fertility;
- Soil contamination from spills from machinery as well as potential spills from the pipeline;
- Migration of contaminants into groundwater and contaminate freshwater systems; and
- Decrease in land use and land capability (agricultural potential).

Description:

The soils in the project area are highly erodible and could potentially lead to loss of soil, erosion and deep gully forming. The establishment of infrastructure could potentially result in the direct loss of soil and soil fertility as the soil will be excavated and potentially mixed. While soils are stockpiled, it will compact, erode and consequently decreased fertility and rehabilitation success. The longer the soils are exposed, the higher the impacts to the soils. Potential spillage may occur from machinery, causing soil contamination, decreasing the land use and rehabilitation success.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Beyond Project Life (6)	Construction of the pipe may cause impacts beyond the life of the project.	Moderate (negative) - 105
Extent	Local Area (3)	The impacts to the soils could lead to large impacts to the local area and the surrounding area.	
Intensity	Irreplicable Loss (6)	Construction could result in the complete loss of soils.	
Probability	Definite (7)	Loss of soils will definitely occur without mitigation.	
Nature	Negative		

Mitigation Measures

- Excavation shall be undertaken during the dry season where practically possible;
- Small equipment with rubber wheels shall be used to minimize the area of impact within the immediate wetland area;
- All soil removed from the trench shall be stockpiled separately adjacent to the trench, within the 5 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. This shall be done to a maximum of 5 m servitude and vehicle movement restricted to the servitude;
- The area will be revegetated after construction if not self-vegetated within 3 months;
- Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas;
- Movement, stockpiling of brings and cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately;
- Place sediment trapping berms on the boundary of the 100 m buffer or end of development;

- If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place;
- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly;
- Stockpiles should only be used for their designated final purposes; and
- The stockpiles should be vegetated if standing longer than 1 month to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Construction of the pipe may cause impacts, however only for the long term when mitigation is followed.	Minor (negative) - 60
Extent	Limited (2)	The impacts should only take place in small areas when mitigation and rehabilitation are followed.	
Intensity	Serious Loss (6)	Impacts to the soils might still be serious, even though mitigation is followed.	
Probability	Likely (5)	Impacts to the soils will likely still taken place even with mitigation.	
Nature	Negative		

5. Activity and Interaction: Installation of parking bays for the construction area and vehicles.

Impact:

- Soil compaction;
- Soil erosion and sedimentation; and
- Soil contamination.

Description:

Due to the high erodibility and clayey nature of the soils, the infrastructure may lead to erosion, head-cut erosion, compaction, increased surface runoff, changes to the natural geomorphology and fertility of the soils. The clayey soils have various restrictions to vegetation and when not managed and planned, the disturbances may lead to proliferation of AIPs.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	Construction should only take place during construction but the impact last for the medium term without mitigation. Impacts such as soil contamination could have a large impact.	Minor (negative) - 40
Extent	Local (3)	Impact could extend beyond the immediate area.	
Intensity	Serious Loss (4)	Impacts could be serious and cause loss of soil, soil contamination, soil fertility and biodiversity loss.	
Probability	Probable (4)	Impacts are probable to occur without mitigation.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Parking bays will be constructed in an already disturbed hard park area outside wetland areas; • Construction shall be undertaken during the dry season where practically possible; • Small equipment with rubber wheels shall be used to minimize the area of impact within the immediate wetland area; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Ensure proper storm water management designs are in place; • Only the designated access routes are to be used to reduce any unnecessary compaction; and • Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Impacts can be mitigated immediately and should not last long.	Negligible (negative)

Extent	Limited (2)	Impact should only be at the point source or where the impact has occurred if mitigated soon enough.	- 21
Intensity	Moderate Loss (3)	Impacts could be moderate even if mitigation is followed.	
Probability	Unlikely (3)	Impacts are unlikely to occur when mitigation measures are followed.	
Nature	Negative		
6. Activity and Interaction: Installation of temporary warning signage.			
Impact:			
<ul style="list-style-type: none"> • Soil compaction; • Soil erosion and sedimentation; and • Soil contamination. 			
Description:			
The temporary installation may lead to soil compaction leading to increased runoff and consequently erosion.			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	Construction should only take place during construction but the impact last for the medium term without mitigation. Impacts such as soil compaction/erosion from the infrastructure could have a large impact (erosion).	Minor (negative) - 40
Extent	Local (3)	Impact could extend beyond the immediate area – head cut erosion.	
Intensity	Serious Loss (4)	Impacts could be serious and cause loss of soil, soil contamination, soil fertility and biodiversity loss.	
Probability	Probable (4)	Impacts are probable to occur without mitigation.	
Nature	Negative		
Mitigation Measures			

- Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area.
- All movement must be contained to one road. Where practical possible, as little as possible movement within the wetlands and catchment will take place.
- If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place;
- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- Ensure proper storm water management designs are in place;
- Only the designated access routes are to be used to reduce any unnecessary compaction; and
- Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential).

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Immediate (1)	Impact will be temporary and should not be for a long term.	Negligible (negative) - 8
Extent	Very Limited (1)	Impact will only occur in immediate area and not beyond when mitigation is followed.	
Intensity	Minor Loss (2)	There will still be small impacts to the soils, even though mitigated.	
Probability	Rare/Improbable (2)	It is rare that large impact will occur from the temporary construction of signs.	
Nature	Negative		

7. Activity and Interaction: Topsoil stripping and stockpiling.

Impact:

- Compaction of soil and therefore increased surface runoff;
- Increased erosion on unprotected soils and consequently sedimentation as these soils is highly erodible;
- Removal of vegetation and top soil decreasing the soil fertility; and
- Compaction, ponding, and changes to the natural hydrological functioning of the landscape.

Description:
The removal of vegetation and topsoil will result in direct changes to the soil geomorphology. This will alter the hydrological regime and flow of water which may contribute to loss of wetlands. The soil stripping may lead to soil compaction leading to increased runoff and consequently erosion. While soils are stockpiled, they are compacted and limit rehabilitation and reinstalment of soils and vegetation cover.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Beyond Project Life (6)	Site clearing should only take place during construction but the impact last for the beyond Project life when mitigation measures are not followed.	Moderate (negative) - 105
Extent	Local Area (3)	The loss of soils through erosion may extend beyond the Project Area.	
Intensity	Serious (6)	Site clearing will result in large and permanent impacts to the soils.	
Probability	Definite (7)	Soils will definitely be impacted due to soil stripping and stockpiling.	
Nature	Negative		

Mitigation Measures

- The topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks;
- Soil is to be stripped when the soil is dry, as to reduce compaction;
- If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place;
- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly;
- Compaction of the removed usable soil must be avoided by prohibiting traffic on stockpiles;
- Stockpiles should only be used for their designated final purposes; and
- The stockpiles should be vegetated to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Site clearing should only take place during construction. When rehabilitation and mitigation is followed the impacts should not last beyond project life.	Minor (negative) - 72
Extent	Limited (3)	When mitigation is followed, impacts should only extend to the Project Area and not beyond.	
Intensity	Serious (5)	Site clearing will result in large and permanent impacts to the soils.	
Probability	Almost Certain (6)	Soils will almost certainly be impacted and disturbed due to soil stripping.	
Nature	Negative		
8. Activity and Interaction: Provision of sanitation facilities during the Construction Phase.			
Impact:			
<ul style="list-style-type: none"> Soil and surface water contamination. 			
Description:			
Sanitation facilities may leak and contaminate the water and soil resulting in health risks to animals and people working in the area. This will affect the soil rehabilitation success.			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Sanitation facilities should only take place during construction. The impact last for the short term.	Negligible (negative) - 10
Extent	Very Limited (1)	Impacts will only be in one small area, outside wetland areas.	
Intensity	Minor Loss (2)	Impacts should be minor due to the short term of these facilities.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas and temporary nature of the impact.	
Nature	Negative		
Mitigation Measures			

- Provide portable toilets for the personnel and provide trash cans all over the site outside wetland areas;
- Portable toilets shall not be placed within the wetlands;
- An agreement with a service provider shall be in place to service the portable toilets on a regular basis to prevent this from becoming a nuisance and health risk;
- All waste shall be removed at the end of each day once construction activities are completed for the day; and
- If any spillage occurs, clean up and remediate immediately.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Immediate (1)	Provision of sanitation facilities should only take place during construction.	Negligible (negative) - 6
Extent	Very Limited (1)	Impacts, if any will only be in one small area, outside wetland areas.	
Intensity	Minimal Loss (1)	Impacts, if any should be minor due to the short term of these facilities and will be remediated immediately if spillages occur.	
Probability	Rare/Improbable (2)	Impacts are improbable due to the small areas and temporary nature of the impact.	
Nature	Negative		

9. Activity and Interaction: Demarcation of the site using fencing and gates.

Impact:

- Soil compaction;
- Soil erosion and sedimentation; and
- Soil contamination.

Description:

Demarcation of the site may lead to soil compaction leading to increased runoff and consequently erosion. Spillage may occur from the machinery/vehicles.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
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Duration	Medium Term (3)	Construction should only take place during the construction phase. The impact last for the medium term.	Moderate (negative) - 21
Extent	Very Limited (1)	Impact will only be in limited areas around the Project Area.	
Intensity	Moderate Loss (3)	Loss and impacts to soils will be minimal, however could potentially lead to compaction and erosion.	
Probability	Unlikely (3)	Impacts are unlikely due to the small areas.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area; • All movement must be contained to one road. Where practical possible, as little as possible movement within the wetlands and catchment will take place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Ensure proper storm water management designs are in place; • Only the designated access routes are to be used to reduce any unnecessary compaction; and • Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Construction should only take place during the construction phase. The impact last for the short term if mitigated immediately.	Minor (negative) - 10
Extent	Very Limited (1)	Impact will only be in limited areas around the Project Area.	
Intensity	Minor Loss (2)	Loss and impacts to soils will be minor if mitigation and rehabilitation measures are followed.	

Probability	Rare/Improbable (2)	Impacts are improbable due to the small areas and when mitigation is followed.	
Nature	Negative		
10. Activity and Interaction: Waste generation and removal of waste.			
Impact:			
<ul style="list-style-type: none"> • Soil contamination • Decreased soil fertility, and land capability; and • Soil compaction. 			
Description:			
During waste removal, spillages may occur which could lead to soil contamination. During the removal process, vehicles may compact the soils, leading to hardened surfaces, increased runoff, erosion and sedimentation.			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Beyond Project Life (6)	Waste and the removal will only take place during construction, but the impact could last beyond the Project life – soil contamination.	Moderate (negative) - 84
Extent	Local Area (3)	Impacts could extend to the local area and the surrounding area if not mitigated.	
Intensity	Serious (5)	Impacts might result in serious impacts to the soils.	
Probability	Almost Certain (6)	It is almost certain that compaction, erosion, and possible contamination may take place from the waste material and removal thereof.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • All movement of construction equipment shall be contained to one road and small servitude; • Where practical possible, as little as possible movement within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; • Light vehicles should be used where possible; 			

<ul style="list-style-type: none"> Waste will be disposed of at a suitable licenced landfill site; All waste shall be removed and stockpiled in one designated area; and If any spillage occurs, clean up and remediate immediately. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Waste and the removal should only take place during construction, and when mitigation is followed, should only last during construction phase.	Negligible (negative) - 32
Extent	Limited (2)	Impacts should only extent to the activity area.	
Intensity	Minor (2)	Impacts will be minor when mitigation is followed.	
Probability	Probably (4)	There is a possibility that impacts might still occur even when mitigation is followed.	
Nature	Negative		

12.2.2 Wetland

The impacts associated with wetlands during the Construction Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-6.

Table 12-6: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Wetlands during the Construction Phase

1. Activity and Interaction: Development and upgrading of a permanent access road to the site.			
Impact Description:			
<ul style="list-style-type: none"> Wetland fragmentation; Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; and Loss of wetland areas. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Permanent (7)	The road will be permanent.	Minor (negative)

Extent	Limited (2)	Impact will only be in a small section of the wetland.	- 48
Intensity	Moderate loss (3)	Due to the area being very impacted already, the intensity will be moderate.	
Probability	Probable (4)	Impacts will probably occur without mitigation.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • The footprint shall be contained to the immediate servitude and demarcated to prevent the movement of unauthorised vehicles into the wetlands; • Keep to designated areas. Movement must be restricted to development footprint. Light vehicles should be used where possible; • All movement of construction equipment shall be contained to one road and small servitude, not larger than 5 m. Where practically possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; and • The footprint for the proposed activity shall be demarcated to prevent the unauthorised entrance to the wetlands. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Permanent (7)	The road will be permanent.	Negligible (negative) - 30
Extent	Very limited (1)	Impact will only be in a small section of the wetland.	
Intensity	Minor loss (2)	Due to the area being very impacted already, the intensity will be minor if mitigation measures are followed.	
Probability	Unlikely (3)	Impacts are unlikely should mitigation measures be followed.	
Nature	Negative		
2. Activity and Interaction: Clearing and grubbing of approximately 0.3 ha.			
Impact Description:			
<ul style="list-style-type: none"> • Direct loss of wetland areas; • Habitat loss; 			

<ul style="list-style-type: none"> Loss of biodiversity; and Erosion and sedimentation of wetland areas. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Site clearing should only take place during construction but the impact may be long term without mitigation.	Minot (negative) - 50
Extent	Local (3)	Impact will only be in a small section of the wetland and impact the local area.	
Intensity	Moderate loss (3)	Due to the area being very impacted already, the intensity will be moderate.	
Probability	Likely (5)	Impacts will likely occur without mitigation.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> Vegetation clearance will be undertaken during the dry season where practically possible; Small equipment with rubber wheels shall be used to minimise the area of impact within the immediate wetland area; All movement must be contained to one road. Where practical possible, as little movement as possible within the wetland and catchment will take place; and Areas that are not self-vegetated within 3 months will be ripped, landscaped and reseeded. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	Site clearing should only take place during construction and impacts should not be longer than 1 year.	Negligible (negative) - 32
Extent	Local (3)	Impact will only be in a small section of the wetland and impact the local area.	
Intensity	Minor loss (2)	Due to the area being very impacted already, the intensity will be minor.	
Probability	Probable (4)	Impacts will probably occur without mitigation.	

Nature	Negative		
3. Activity and Interaction: Establishment of the laydown area and contractors camp in an already disturbed area.			
Impact Description:			
<ul style="list-style-type: none"> • Indirect loss of wetland areas; • Habitat loss; • Loss of biodiversity; and • Erosion and sedimentation of wetland areas. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	Impact should only occur during the Construction Phase but the impact may last for the medium term without mitigation.	Negligible (negative) - 21
Extent	Limited (2)	Impact will occur outside the wetland area.	
Intensity	Minor loss (2)	Due to the activities being outside the wetlands, the intensity will be minor.	
Probability	Unlikely (3)	Impacts are unlikely.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Excavation shall be undertaken during the dry season where practically possible; • Small equipment with rubber wheels shall be used to minimize the area of impact within the immediate wetland area; • If the construction take longer than 1 month, vegetate the areas to prevent erosion and loss of soil and sedimentation; and • Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Short Term (3)	Impact should only occur during the Construction Phase. The impact will be short term should the mitigation be implemented.	Negligible (negative)

Extent	Very limited (1)	Impact will be mostly outside the wetland area, but with very limited impacts to the wetlands.	- 12
Intensity	Minimal loss (2)	Due to the activities being outside the wetlands, the intensity will be minimal.	
Probability	Rare/improbable (2)	Impacts are improbable should the proposed mitigation be followed.	
Nature	Negative		
4. Activity and Interaction: Construction of the pump station and the pipeline from the pump station to the Discard Disposal Facility solution trench.			
Impact Description:			
<ul style="list-style-type: none"> • Wetland fragmentation; • Water quality and quantity contamination and deterioration; • Habitat and biodiversity loss; • Increased AIPs; • Erosion and sedimentation of wetland areas; and • Loss of wetland areas. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Project Life (5)	Construction of the pipe may cause impacts for the life of the project.	Moderate (negative) - 98
Extent	Local Area (3)	The loss of wetland areas may lead to reduced water to the local area.	
Intensity	Serious (6)	Construction will result in the complete loss of wetland area.	
Probability	Definite (7)	Loss of wetland areas will definitely occur.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Excavation shall be undertaken during the dry season where practically possible; • Small equipment with rubber wheels shall be used to minimise the area of impact within the immediate wetland area; 			

- All soil removed from the trench shall be stockpiled separately adjacent to the trench, but within the 5 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. The working servitude will be a maximum of 5 m wide and all vehicle movement shall be restricted to the servitude;
- The area will be revegetated after construction if not self-vegetated within 3 months;
- Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas;
- If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation;
- Movement, stockpiling and delivery of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately; and
- Place sediment trapping berms on the boundary of the 100 m buffer of the wetland, or at the edge of the development area.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Site clearing should only take place during construction but the impact may last for the long term.	Minor (negative) - 55
Extent	Limited Area (3)	The loss of wetland areas may lead to reduced water to the immediate area.	
Intensity	Serious loss (4)	Construction will result in the complete loss of a very small area of wetland area, however, should mitigation be implemented the impact will be reduced.	
Probability	Likely (5)	Loss of wetland areas will likely occur even if mitigation measures are implemented.	
Nature	Negative		

5. Activity and Interaction: Installation of parking bays for the construction area and vehicles.

Impact Description:

- Erosion and sedimentation of wetland areas;
- Water quality and quantity contamination and deterioration; and
- Habitat and biodiversity loss.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	Impact should only occur during the Construction Phase but the impact may last for the medium term without mitigation.	Negligible (negative) - 21
Extent	Limited (2)	Impact will only occur outside the wetland area therefore spillage will be outside the wetlands.	
Intensity	Minor loss (2)	Due to the activities being outside the wetlands, the intensity will be minored.	
Probability	Unlikely (3)	Impacts are unlikely.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Parking bays will be constructed outside wetland areas; • Construction shall be undertaken during the dry season where practically possible; • Small equipment with rubber wheels shall be used to minimize the area of impact within the immediate wetland area; • If the construction is going to take longer than 3 months, vegetate the areas to prevent erosion and loss of soil and sedimentation; and • Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Short Term (3)	Impact should only occur during the Construction Phase. The impact will be short term should the mitigation be implemented.	Negligible (negative) - 14
Extent	Very limited (1)	Impact will only occur outside the wetland area therefore spillage will be outside the wetlands.	
Intensity	Moderate loss (3)	Due to the activities being outside the wetlands, the intensity will be moderate.	
Probability	Rare/improbable (2)	Impacts are improbable when mitigation is followed.	
Nature	Negative		

6. Activity and Interaction: Installation of temporary warning signage.

Impact Description:

- Wetland fragmentation; and
- Erosion and sedimentation of wetland areas.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Short Term (3)	Impact should only occur during the Construction Phase. The impact will be short term.	Negligible (negative) - 14
Extent	Very limited (1)	Impact will only occur outside the wetland area.	
Intensity	Moderate loss (3)	Due to the activities being outside the wetlands, the intensity will be moderate.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas.	
Nature	Negative		

Mitigation Measures

- Warning signage will be placed outside of wetland areas as far as possible;
- Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area; and
- All movement must be contained to one road. Where practical possible, as little movement as possible within the wetlands and catchment will take place.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Impact should only occur during the Construction Phase. The impact will be short term.	Negligible (negative) - 10
Extent	Very limited (1)	Impact will only occur outside the wetland area.	
Intensity	Minor loss (2)	Due to the activities being outside the wetlands, the intensity will be moderate.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas.	
Nature	Negative		

7. Activity and Interaction: Topsoil stripping and stockpiling.

Impact Description:

- Erosion and sedimentation of wetland areas; and
- Water quality and quantity contamination and deterioration.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Project Life (5)	Site clearing should only take place during construction but the impact may last for the Project life.	Moderate (negative) - 98
Extent	Local Area (3)	The loss of wetland areas may lead to reduced water to the local area.	
Intensity	Serious (6)	Site clearing will result in the complete loss of wetland area.	
Probability	Certain (7)	Loss of wetland areas will definitely occur.	
Nature	Negative		

Mitigation Measures

- During the excavation, the topsoil must be stockpiled separate from the underlying material (B-horizon) to place the soil profile back in the original horizon-sequence;
- If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation;
- AIPs shall be controlled during and after the construction of the trench is completed; and
- No raw materials shall be stockpiled within the wetland, but shall be stockpiled in demarcated areas outside the wetland areas.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Project Life (5)	Site clearing should only take place during construction but the impact may last for the Project life.	Minor (negative) - 44
Extent	Limited (2)	The loss of wetland areas may lead to reduced water to the local area.	
Intensity	Serious Medium Term	Site clearing will result in complete loss of wetland area.	

	(4)		
Probability	Probable (4)	Loss of wetland areas will occur; mitigation measures will attempt to limit the impacts on other wetland areas within the surrounding areas.	
Nature	Negative		
8. Activity and Interaction: Provision of sanitation facilities during the construction phase.			
Impact Description:			
<ul style="list-style-type: none"> Water quality and quantity contamination and deterioration. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Sanitation facilities should only be provided during the Construction Phase. The impact is likely to last for the short term.	Negligible (negative) - 10
Extent	Very limited (1)	Impact will occur outside of the wetland area and will have very limited impacts on the wetland.	
Intensity	Minor loss (2)	Due to the activities being outside the wetlands, the intensity will be moderate.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> Provide portable toilets for the personnel and provide trash cans all over the site outside wetland areas; Portable toilets shall not be placed within the wetlands; An agreement with a service provider shall be in place to service the portable toilets on a regular basis to prevent this from becoming a nuisance; and All waste shall be removed to the site camp at the end of each day once construction activities are completed for the day. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Very limited/isolated (1)	Provision of sanitation facilities should only take place during construction for limited time.	Negligible (negative) - 6

Extent	Very limited (1)	Impact will occur outside the wetland area and will have very limited impacts on the wetlands.	
Intensity	Minimal loss (1)	Due to the activities being outside the wetlands, the intensity will be minimal.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas.	
Nature	Negative		
9. Activity and Interaction: Demarcation of the site using fencing and gates.			
Impact Description:			
<ul style="list-style-type: none"> Wetland fragmentation; and Erosion and sedimentation of wetland areas. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (3)	Impact should only occur during the Construction Phase. The impact will be short term.	Moderate (negative) - 14
Extent	Very limited (1)	Impact will occur outside the wetland area and have very limited impact on the wetlands.	
Intensity	Moderate loss (3)	Due to the activities being outside the wetlands, the intensity will be moderate.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> Linear infrastructure will be placed outside of wetland areas as far as possible; Culverts and constructed trenches will be used to prevent fragmentation of wetlands; Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area; and All movement must be contained to one road. Where practical possible, as little movement as possible within the wetlands and catchment will take place. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance

Duration	Short Term (2)	Impact should only occur during the Construction Phase. The impact will be short term.	Minor (negative) - 10
Extent	Very limited (1)	Impact will occur outside the wetland area and have very limited impact on the wetlands.	
Intensity	Minor loss (2)	Due to the activities being outside the wetlands, the intensity will be moderate with mitigation.	
Probability	Rare/improbable (2)	Impacts are improbable due to the small areas.	
Nature	Negative		
10. Activity and Interaction: Waste generation and removal of waste.			
Impact Description:			
<ul style="list-style-type: none"> • Water quality and quantity contamination and deterioration; • Habitat and biodiversity loss; • Erosion and sedimentation of wetland areas; and • Loss of wetland areas. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Project Life (5)	Waste generation and removal should only take place during construction but the impact may last for the Project life.	Moderate (negative) - 98
Extent	Local Area (3)	The loss of wetland areas may lead to reduced water quality and loss of wetlands in the local area.	
Intensity	Serious (6)	Impacts might result in the complete loss of wetland area.	
Probability	Certain (7)	Loss of wetland areas will occur.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • All movement of construction equipment shall be contained to one road and small servitude; 			

- Where practical possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located;
- The footprint for the proposed activity shall be demarcated to prevent unauthorised entrance to the wetlands;
- All construction equipment and personnel shall keep to designated areas;
- Light vehicles should be used where possible; and
- Waste will be disposed of at a registered landfill site.

Post-Mitigation

Dimension	Rating	Motivation	Significance
Duration	Medium term (4)	Waste generation and removal should only take place during construction but the impact may last for the medium term.	Negligible (negative) - 30
Extent	Limited Area (2)	The loss of wetland areas may lead to impacts only on specific areas in the landscape.	
Intensity	Serious loss (4)	Impacts might result in the complete loss of wetland area even when mitigated.	
Probability	Unlikely (3)	With mitigation measures, impacts are unlikely.	
Nature	Negative		

12.3 Operational Phase

The Operational Phase includes the maintenance of the pipeline and pump station.

12.3.1 Soil, Land use and Land Capability

The impacts associated with soil and land capability during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-7.

Table 12-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase

1. Activity and Interaction: Maintenance will be undertaken of the pumps as required.
<p>Impacts:</p> <ul style="list-style-type: none"> • Soil compaction; • Soil erosion due to increased runoff; and • Soil contamination due to spillage from pump and vehicles.

Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Project Life (5)	Impacts could last for the long term if compaction, erosion or spillage of hydrocarbons occur.	Negligible (negative) - 33
Extent	Local (3)	Impact will only be in a small section of the Project Area.	
Intensity	Moderate Loss (3)	Impacts could lead to moderate loss of soil and land capability.	
Probability	Unlikely (3)	It is unlikely that impacts from the maintenance might occur.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Keep to designated areas. Movement must be restricted to development footprint; • Light vehicles should be used where possible; • All movement of personnel and light vehicles shall be contained to one road; and • Where practically possible, as little as possible movement within the wetlands will take place and access of vehicles denied. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	If an impact occurs and is remediated immediately, impact will only last for a short while.	Negligible (negative) - 12
Extent	Limited (2)	Impact will only be within the immediate footprint if mitigated soon enough.	
Intensity	Minor Loss (2)	Impacts could lead to minor losses of soil and land capability if mitigated correctly.	
Probability	Rare/Impossible (2)	It is rare that impacts from the maintenance will occur, especially when mitigation measures are followed.	
Nature	Negative		

12.3.2 Wetlands

The impacts associated with wetlands during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-8.

Table 12-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Wetlands during the Operational Phase

1. Activity and Interaction: Maintenance of the pumps will be undertaken as required.			
Impacts:			
<ul style="list-style-type: none"> • Soil erosion due to increased surface water runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Siltation of wetlands due to erosion; and • Change in habitat and potential change in species composition. 			
<i>Prior to Mitigation/Management</i>			
Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Maintenance will take place for the duration of the project life.	Minor (negative) - 40
Extent	Local (3)	Impact will only be in a small section of the wetland.	
Intensity	Moderate loss (3)	Due to the area being very impacted already, the intensity will be moderate.	
Probability	Probable (4)	Impacts will probably occur without mitigation.	
Nature	Negative		
<i>Mitigation Measures</i>			
<ul style="list-style-type: none"> • Keep to designated areas. Movement must be restricted to development footprint; • Light vehicles should be used where possible; • All movement of personnel and light vehicles shall be contained to one road; and • Where practically possible, as little movement as possible within the wetlands will take place and access of vehicles to wetland areas will be denied. 			
<i>Post-Mitigation</i>			
Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	Maintenance will take place for the duration of the project life.	Negligible (negative)

Extent	Limited (2)	Impact will only be in a small section of the wetland and impacts will be minimal if mitigation is followed.	- 16
Intensity	Minor loss (2)	Due to the area being very impacted already, the intensity will be minor if mitigation is followed.	
Probability	Rare/Improbable (2)	It is unlikely that impacts will occur if mitigation is followed.	
Nature	Negative		

12.4 Decommissioning and Rehabilitation Phase

The activities associated with the rehabilitation of the site will entail decommissioning of the pipeline and pumpstations infrastructures at the end of life of the project. The topsoil will then be placed according to the landscape created. The pipeline and pump station will be dismantled and removed off site and any possible soil contamination will be removed. The area will then be permitted to revegetate naturally.

12.4.1 Soil, Land use and Land Capability

The impacts associated with soil and land capability during the Decommission and Rehabilitation Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-9.

Table 12-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Decommission and Rehabilitation Phase

1. Activity and Interaction: All rubble and redundant material shall be removed from site to an appropriate licensed facility.			
Impacts:			
<ul style="list-style-type: none"> ● Soil compaction; and ● Soil erosion and sedimentation leading to loss of soil. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Rehabilitation and removal of waste will only be for a short period.	Negligible (negative) - 30
Extent	Limited (2)	The activity will only be within the Project Area.	

Intensity	Minor Loss (2)	The activity will only cause minor losses to soils, if any. Designated roads will be used, and no new areas will be compacted.	
Probability	Unlikely (5)	It is unlikely that impacts will result from the activity.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Keep to designated areas. Movement must be restricted to development footprint; • Light vehicles should be used where possible; • All movement of personnel and light vehicles shall be contained to one road; • Waste will be stored outside the wetland and removed as quickly as possible from the site; • All movement of construction equipment shall be contained to one road and small servitude; • Waste will be disposed of at a suitable licenced landfill site; • All waste shall be stockpiled in one designated area; and • If any hydrocarbon or hazardous substances spillage occurs, clean up and remediate immediately. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Immediate (1)	The removal of waste will be less than one month and have limited effects.	Negligible (negative) - 6
Extent	Very Limited (1)	The activity will only be within the waste storage area.	
Intensity	Minimal to no Loss (1)	The activity will only cause minimal loss to soils.	
Probability	Rare/Improbable (2)	It is unlikely that impacts will result from the activity.	
Nature	Negative		
2. Activity and Interaction: Areas where compaction has occurred will be ripped to allow the growth of vegetation.			

- Impacts:**
- Soil erosion due to wind and surface water runoff;
 - Sedimentation of wetlands and low lying areas leading to deteriorated water quality and quantity and loss of vegetation cover;
 - Change in habitat and potential change in species composition – increased AIPs; and
 - Deep soil compaction and loss of soil structure due to the high clay content of the soils.

Prior to Mitigation/Management

Dimension	Rating	Motivation	Significance
Duration	Long Term (4)	If ripping is not done at the right time, soil structure can be destroyed and take long to remediate.	Minor (negative) - 55
Extent	Limited (2)	The activity will only be within the Project Area and where soils are being ripped.	
Intensity	Serious Loss (5)	Impacts can be serious and cause long term damage to the soils when mitigation measures are not followed.	
Probability	Likely (5)	It is likely that impacts to the Project Area will occur when mitigation measures are not followed.	
Nature	Negative		

Mitigation Measures

- Only rip at the end of the wet season/ beginning of the dry season to prevent breakdown of soil aggregates;
- Do not till/rip in the wet season as this will cause damage to the soil geomorphology as well as the equipment used;
- Rip to at least 400 mm to prevent deep compaction and therefore waterlogging of newly vegetated areas;
- Re-vegetate the area as soon as ripping has occurred to prevent soils to be exposed for long periods. The vertic soils are highly susceptible to erosion;
- Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas;
- Implement a AIPs program to prevent proliferation of AIPs and deterioration of soil fertility; and
- Avoid creating narrow preferential flow paths as the this could lead to erosion gullies as the soils are susceptible to erosion.

Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Medium Term (3)	If ripping is not done at the right time, soil structure can be destroyed and medium time to remediate.	Negligible (negative) - 32
Extent	Limited (2)	The activity will only be within the Project Area and where soils are being ripped.	
Intensity	Moderate Loss (3)	Impacts will only be moderate when mitigation measures are followed.	
Probability	Probable (4)	Impacts will probably still occur as the soils will be exposed for a period and due to the clay nature of the soils.	
Nature	Negative		
3. Activity and Interaction: Area shall be shaped and contoured to mimic its surrounding areas and to encourage the recovering and continuity of the wetland vegetation.			
Impacts:			
<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Soil geomorphological changes (loss of structure, fertility, Organic Material)); and • Proliferation of AIPs. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Reshaping and revegetation of the areas will only occur for a short period.	Negligible (negative) - 24
Extent	Limited (2)	The activity will only be within the Project Area.	
Intensity	Minor Loss (2)	Activity will help improve the impacts and therefore will have very limited impacts, however, could lead to soil erosion and geomorphological changes.	
Probability	Probable (4)	It is possible that increases AIPs will occur as well as erosion and geomorphological changes.	
Nature	Negative		
Mitigation Measures			

- Only reshape and work the land at the end of the wet season/ beginning of the dry season to prevent breakdown of soil aggregates;
- Do not till/rip/shape in the wet season as this will cause damage to the soil geomorphology as well as the equipment used;
- Re-vegetate the area as soon as ripping has occurred to prevent soils to be exposed for long periods. The vertic soils are highly susceptible to erosion;
- Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas;
- Avoid creating narrow preferential flow paths as the this could lead to erosion gullies as the soils are susceptible to erosion; and
- Rehabilitation work should be performed during the dry season, unless it is highly urgent and could be detrimental to health of wetland areas.

Post to Mitigation/Management

Dimension	Rating	Motivation	Negligible (negative) - 15
Duration	Short Term (2)	Reshaping and revegetation of the areas will only occur for a short period when mitigation is followed.	
Extent	Very Limited (1)	The activity will only be within small areas, where seen necessary to do so.	
Intensity	Minor Loss (2)	Activity will help improve the impacts and therefore will have very limited impacts, however, could still lead to geomorphological impacts.	
Probability	Unlikely (3)	It is unlikely that large impacts will arise from the activity when mitigation measures are followed.	
Nature	Negative		

12.4.2 Wetlands

The impacts associated with wetlands during the Decommissioning and Rehabilitation Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-10.

Table 12-10: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Wetlands during the Operational Phase

1. Activity and Interaction: All rubble and redundant material shall be removed from site to an appropriate licensed facility.			
Impacts:			
<ul style="list-style-type: none"> • Soil erosion due to surface runoff/soil compaction; • Siltation of surface water resources leading to deteriorated water quality and quantity; and • Change in habitat and potential change in species composition. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Rehabilitation and removal of waste will only be for a short period.	Negligible (negative) - 30
Extent	Limited (2)	The activity will only be within the Project Area.	
Intensity	Minor Loss (2)	The activity will only cause minor losses to the wetlands.	
Probability	Unlikely (5)	It is unlikely that impacts will result from the activity.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Keep to designated areas. Movement must be restricted to development footprint; • Light vehicles should be used where possible; • All movement of personnel and light vehicles shall be contained to one road; • Where practically possible, as little movement as possible within the wetlands will take place and access of vehicles to wetland areas will be denied; and • Waste will be stored outside the wetland and removed as soon as possible from the site. 			
Post-Mitigation			
Dimension	Rating	Motivation	Significance
Duration	Immediate (1)	The removal of waste will be less than one month and have limited effects.	Negligible (negative) - 9
Extent	Very Limited (1)	The activity will only be within the waste storage area.	

Intensity	Minimal to no Loss (1)	The activity will only cause minimal loss to wetlands.	
Probability	Unlikely (3)	It is unlikely that impacts will result from the activity.	
Nature	Negative		
2. Activity and Interaction: Areas where compaction has occurred will be ripped to allow the growth of vegetation.			
Impacts:			
<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Change in habitat and potential change in species composition; and • Increased AIPs. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Ripping of the areas will only occur for a short period.	Negligible (negative) - 20
Extent	Limited (2)	The activity will only be within the Project Area.	
Intensity	Minimal Loss (1)	Activity will help reduce the impacts.	
Probability	Probable (4)	It is probable that increases in AIPs will occur as well as erosion.	
Nature	Negative		
Mitigation Measures			
<ul style="list-style-type: none"> • Erection of sediment trapping berms around (100 m buffer) the wetland areas to prevent sedimentation of wetland areas during the rehabilitation of the site; • Shaping of landscape should be performed in a manner that will allow water to drain freely towards wetland areas; • If self-vegetation has not occurred within 3 months of the work, seeding has to be done with an indigenous seedmix suitable for the area; • Implement a AIPs program to prevent proliferation of AIPs; • Avoiding creating narrow preferential flow paths as the this could lead to erosion; and • As far as possible, conduct work during the dry season. 			
Post-Mitigation			

Dimension	Rating	Motivation	Significance
Duration	Immediate (1)	Ripping of the areas will only occur for a very short period.	Negligible (negative) - 9
Extent	Very Limited (1)	The activity will only be within a small area when mitigation is followed.	
Intensity	Minimal Loss (1)	Activity will help reduce the impacts and therefore will have very limited impacts itself.	
Probability	Unlikely (3)	It is unlikely that impacts will occur when mitigation measures are followed.	
Nature	Negative		
3. Activity and Interaction: Area shall be shaped and contoured to mimic its surrounding areas and to encourage the recovery and continuity of the wetland vegetation.			
Impacts:			
<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Change in habitat and potential change in species composition; and • Increased AIPs. 			
Prior to Mitigation/Management			
Dimension	Rating	Motivation	Significance
Duration	Short Term (2)	Reshaping and revegetation of the areas will only occur for a short period.	Negligible (negative) - 20
Extent	Limited (2)	The activity will only be within the Project Area.	
Intensity	Minimal Loss (1)	Activity will help reduce the impacts and therefore will have very limited impacts itself.	
Probability	Probable (4)	It is probable that increases in AIPs will occur as well as erosion and loss of habitat.	
Nature	Negative		
Mitigation Measures			

- Shaping of landscape should be performed in a manner that will allow water to drain freely towards wetland areas;
- If self-vegetation has not occurred within 3 months of the work, seeding has to be done;
- Implement a AIPs program to prevent proliferation of AIPs;
- Avoiding creating narrow preferential flow paths as the this could lead to erosion; and
- As far as possible, conduct work during the dry season. Rehabilitation work should be performed during the dry season, unless it is highly urgent and could be detrimental to the health of wetland areas.

Post to Mitigation/Management

Dimension	Rating	Motivation	Negligible (negative) - 15
Duration	Short Term (2)	Reshaping and revegetation of the areas will only occur for a short period.	
Extent	Limited (2)	The activity will only be within the Project Area.	
Intensity	Minimal Loss (1)	Activity will help reduce the impacts and therefore will have very limited impacts itself.	
Probability	Unlikely (3)	It is probable that increases in AIPs will occur as well as erosion and loss of habitat.	
Nature	Negative		

12.5 Cumulative Impacts

12.5.1 Soil, Land Use and Land Capability

Cumulative impacts on soil resources were viewed in the light of similar mining related activities or related operations within the catchment that contribute similar or related pollutants to soil resources within or downstream of the project area.

Mining related activities and associated activities that historically and currently impacting the soil resources include:

- Geomorphological changes to the natural soils and landscape. These include excavations, infillings, compaction, ponding, hardened surfaces and mixing of soil;
- Loss of habitat, vegetation and growth medium through vegetation clearing, ripping, AIPs proliferation and vehicle movement;
- Erosion, loss of topsoil and organic material and sedimentation due to hardened surfaces, vehicle movement, sedimentation causing loss of basal cover and suffocating vegetation growth;

- Sedimentation and pollution of water courses (wetlands); and
- Soil contamination through possible acid and sulphate, mine impacted water (seepage from the Discard Facility Discard Facility) and possible heavy metals.

The cumulative impacts may therefore have a significant effect on the current soil resources and therefore impacting the land use and land capability of the project area. Possible contaminated soil (white residue and sulphur smell) has the potential to directly impact the water quality and quantity as well as vegetation of the area.

12.5.2 Wetlands

The mining related activities within the project area and catchment have led to losses in wetland areas that may have facilitated increased water flow and also have increased the number of pollutants flowing into the water resources. The alteration of vegetation and surface flow has led to the onset of erosion in the wetlands and this may be perpetuated further by mining and related activities within the project area. Mining related activities may disturb the hydrological patterns further which could in turn lead to large scale desiccation of wetland areas and the direct loss of some of the wetland areas because of water flow being cut off.

The area is heavily impacted and very limited natural areas occur within the project area.

12.5.3 Heritage

No heritage resources were identified within the proposed development footprint area and therefore no direct impacts to heritage resources are envisaged. This notwithstanding, the proposed project does pose the risk of cumulative impacts on the landscape and there is potential for low-risk and unplanned events to occur.

12.6 Unplanned and Low Risk Events

Unplanned events may occur during the project that may have potential impacts which will need mitigation and management. Information on potential impacts from unplanned events and recommended management plans are provided in this section. Table 12-11 below provides a summary of the identified project activities that may pose a risk.

Table 12-11: Unplanned Events, Low Risks and their Management Measures

Unplanned Risk	Mitigation Measures
<ul style="list-style-type: none"> Hazardous substance and (or) contaminant spills from mining operation, infrastructure and associated activities. 	<ul style="list-style-type: none"> Prevent any spills from occurring; Ensure correct storage of all hazardous substances at operations as per each substance specific storage requirements (e.g. sealed containers for hydrocarbons); If a spill occurs it is to be cleaned up (Drizit spill kit/ Zupazorbtype spill kit, oil or chemical spill kit) immediately and reported to the appropriate authorities when necessary; Pipelines must be checked regularly for leaks; Pipelines must be maintained; Ensure emergency response plans are in place; Contractors must ensure that all employees are aware of the procedure for dealing with spills and leaks and undergo training on site; Ensure that emergency spill equipment is available; All machines are to be serviced and refuelled in demarcated bunded areas, workshops or at appropriate off-site locations; If a significant (> 5 litres (L)) spill occurs, it is to be cleaned up immediately, reported to the appropriate authorities and recorded; and Contaminated soils must be disposed in a registered and licensed landfill facility.
<ul style="list-style-type: none"> Unplanned structural deterioration or accidents along the pipeline in the vicinity of wetlands. 	<ul style="list-style-type: none"> Install safety valves and emergency switches that can be used to seal off leakages from pipelines when noticed or triggered; Ensure that spill kits, and trained staff capable of using the kits, are available on site in case of accidental spillages; and Maintenance of the pipeline should be considered an ongoing process where leakages or issues with the pipe should be reported to the Environmental Practitioner of the project immediately after detection.

12.7 The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

The proposed project will have a positive impact on the environment. The water will be pumped from Wollies se Gat through the underground pipeline to the RWD where it will be reused. This will ensure the contamination is limited and confined to the immediate area.

The negative impact expected from the proposed project are the chemical spills and/ or contaminant spills and the pipeline leakages. Negative impacts with regards to the biophysical environment include potential contamination of the area due to spillage of hydrocarbon products or leakages from the pipeline.

12.8 The Possible Mitigation Measures that could be Applied and the Level of Risk

Mitigation measures for each identified impact have been proposed and are presented with the impact ratings in Section 11 above.

12.9 Motivation where no Alternatives Sites were Considered

The locations of the proposed activity associated with this application have been determined based on their intended use. The location of the proposed activity was assessed based on the need and desirability of the project. No alternative sites (i.e. locations) were considered, the site was chosen based on the location closest to the quarry and the existing land use. The site is surrounded by an existing railway and a conveyor belt. Placing the pipeline underground was the best option considered. A more detailed description is provided in Section 8.

12.10 Statement Motivating the Alternative Development Location within the Overall Site

No alternatives have been identified for the proposed project. The location was chosen based on the intend of the project. A more detailed description is provided in Section 8.

13 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity

The identification of potential new impacts associated with the proposed project were informed by the environmental specialist investigations undertaken.

Following the identification of potential impacts and detailed baseline environment, the impacts were assessed utilising the Digby Wells' methodology which assesses the nature of the impact, duration and extent, intensity and the probability of the impact occurring. Following

the assessment of the potential impacts, mitigation measures are provided, and the potential impacts are assessed post-mitigation. The significance of the pre-mitigation impacts, the proposed mitigation measures and the post-mitigation significance ratings are detailed per environmental aspect per phase of the Project in Section 11.

14 Assessment of Each Identified Potentially Significant Impact and Risk

Table 14-1 presents the potential impacts assessed per project activity and per phase as well as their proposed mitigation / enhancement measures for the proposed new activities subject to the BA Process.

Table 14-1: Assessment of Each Identified Impact

Project Activity	Potential Impact	Aspects Affected	Phase	Significance	Mitigation Type	Significance
Development and upgrading of a permanent access road to the site.	<ul style="list-style-type: none"> Soil compaction; Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; Soil erosion (surface erosion, head cut erosion) and sediment release to wetlands; Alteration of topographies; and Soil contamination from hydrocarbon or hazardous substance spills and leakages 	Soils, Land use and Land Capability	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Only the designated access routes are to be used to reduce any unnecessary compaction; Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential); Unused roads must be rehabilitated to prevent hardened surfaces; and Implement a stormwater management plan to prevent impacts from the roads to the soils (erosion, head-cut erosion, increased runoff, loss of soil, water ponding). 	Minor (negative)
Topsoil stripping and stockpiling.	<ul style="list-style-type: none"> Compaction of soil and therefore increased surface runoff; Increased erosion on unprotected soils and consequently sedimentation as these soils is highly erodible; Removal of vegetation and top soil decreasing the soil fertility; and Compaction, ponding, and changes to the natural hydrological functioning of the landscape. 	Soils, Land use and Land Capability	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> The topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; All stockpiles are to be kept to a maximum height of 4 m; Soil is to be stripped when the soil is dry, as to reduce compaction; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; Compaction of the removed usable soil must be avoided by prohibiting traffic on stockpiles; Stockpiles should only be used for their designated final purposes; and The stockpiles should be vegetated to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 	Minor (negative)

Project Activity	Potential Impact	Aspects Affected	Phase	Significance	Mitigation Type	Significance
Construction of the pump station and the pipeline from the pump station to the TEP Discard Facility Discard Facility solution trench.	<ul style="list-style-type: none"> Removal of the soil changing the natural geomorphology; Soil erosion and sedimentation; Soil compaction and topsoil loss leading to reduced fertility; Soil contamination from spills from machinery as well as potential spills from the pipeline; Migration of contaminants into groundwater and contaminate surface water systems; and Decrease in land use and land capability (agricultural potential). 	Soils, Land use and Land Capability	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment with rubber wheels shall be used to minimise the area of impact within the immediate wetland area; All soil removed from the pit shall be stockpiled separately adjacent to the pit, within the 4 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. This shall be done to a maximum of 45 m servitude and vehicle movement restricted to the servitude; The area will be revegetated after construction if not self-vegetated within 3 months; Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas; Place sediment trapping berms on the boundary of the 100 m buffer or end of development; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; Stockpiles should only be used for their designated final purposes; and The stockpiles should be vegetated if standing longer than 1 month to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 	Minor (negative)
Waste generation and removal of waste.	<ul style="list-style-type: none"> Soil contamination Decreased soil fertility, and land capability; and Soil compaction. 	Soils, Land use and Land Capability	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> All movement of construction equipment shall be contained to one road and small servitude; Waste removal trucks shall not be allowed to leave the demarcated road and enter any wetlands; Light vehicles should be used where possible; Waste will be disposed of at a suitably licenced landfill site; All waste shall be removed and stockpiled in one designated area; and If any spillage occurs, clean up and remediate immediately 	Negligible (negative)

Project Activity	Potential Impact	Aspects Affected	Phase	Significance	Mitigation Type	Significance
Construction of the pump station and the pipeline from the pump station to the TEP Discard Disposal Facility solution trench.	<ul style="list-style-type: none"> Wetland fragmentation; Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; Increased AIPs; Erosion and sedimentation of wetland areas; and Loss of wetland areas. 	Wetlands	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment with rubber wheels shall be used to minimise the area of impact within the immediate wetland area; All soil removed from the trench shall be stockpiled separately adjacent to the trench, but within the 5 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. The working servitude will be a maximum of 5 m wide and all vehicle movement shall be restricted to the servitude; The area will be revegetated after construction if not self-vegetated within 3 months; Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas; If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation; Movement, stockpiling and delivery of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately; and Place sediment trapping berms on the boundary of the 100 m buffer of the wetland, or at the edge of the development area. 	Minor (negative)
Topsoil stripping and stockpiling	<ul style="list-style-type: none"> Erosion and sedimentation of wetland areas; and Water quality and quantity contamination and deterioration. 	Wetlands	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> During the excavation, the topsoil must be stockpiled separate from the underlying material (B-horizon) to place the soil profile back in the original horizon-sequence; If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation; AIPs shall be controlled during and after the construction of the trench is completed; and No raw materials shall be stockpiled within the wetland, but shall be stockpiled in demarcated areas outside the wetland areas. 	Minor (negative)

Project Activity	Potential Impact	Aspects Affected	Phase	Significance	Mitigation Type	Significance
Waste generation and removal of waste.	<ul style="list-style-type: none"> Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; Erosion and sedimentation of wetland areas; and Loss of wetland areas. 	Wetlands	Construction Phase	Moderate (negative)	<ul style="list-style-type: none"> All movement of construction equipment shall be contained to one road and small servitude; Where practical possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; The footprint for the proposed activity shall be demarcated to prevent unauthorised entrance to the wetlands; All construction equipment and personnel shall keep to designated areas; Light vehicles should be used where possible; and Waste will be disposed of at a registered landfill site. 	Negligible (negative)

15 Summary of Specialist Reports

Brief specialist inputs included in the baseline environment, potential impacts and the recommended mitigation measures are discussed in Table 15-1.

Table 15-1: Specialist studies undertaken for the Proposed Project

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the BAR	Reference to applicable section of report where specialist recommendations have been included
Soil, Land Use and Land Capability Assessment	<ul style="list-style-type: none"> If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place at regular intervals or after high rainfall events. Such as revegetation, erosion berms, culverts or gabions; Re-vegetate the area as soon as reshaping has taken place to prevent exposed soils; Runoff must be controlled and managed using proper stormwater management measures; Restriction of vehicle movement over sensitive areas to reduce compaction; Do not rip/shape the area in the wet season; If soil is polluted, treat the soil using <i>in situ</i> bioremediation; If <i>in situ</i> treatment is not possible then the polluted soil must be classified according to the minimum requirements for the handling, classification, and disposal of hazardous material, and disposed at an appropriate, permitted or licensed disposal facility; All vehicles and machines must be parked within park areas, and must be checked daily for leaks; Re-fuelling must take place on a sealed surface area away from soils to prevent seepage of hydrocarbons into the soil; Place drip trays where vehicles or machinery leaks are occurring; 	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Soil Specialist.

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the BAR	Reference to applicable section of report where specialist recommendations have been included
	<ul style="list-style-type: none"> Fuel, grease, and oil spills should be remediated using a commercially available emergency clean up kits; Any contractors on site must ensure that all employees are aware of the procedure for dealing with spills, and leaks, and undergo training on-site; Soil pollution monitoring should be conducted at selected locations on the project site to detect any extreme levels of pollutants; Establishment of effective soil cover such as lawn grass around constructed infrastructure for adequate protection from wind, and water erosion; and Minimise unnecessary removal of the natural vegetation cover outside the development footprint. 		
Wetland Impacts Assessment	<ul style="list-style-type: none"> Recreate wetland habitat after construction of the pipeline. Ensure proper landscaping, shaping and revegetation; Improved vegetation cover and establish hydrophytic plants and facultative hydrophytes that are native to the area. Reduced risk of erosion and sedimentation. If self-vegetation has not occurred in 3 months, re-seeding should be done; Reduced risk of erosion, compaction, and the creation of preferential flow paths. Maintain linear infrastructure such as roads; and Improved water quality and prevention of pollution. Prevent contaminated water entering the wetland. If spills or leakages from the pipe occur, it should be cleaned up immediately. 	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Wetland Specialist.
Rehabilitation Assessment	<ul style="list-style-type: none"> The rehabilitation plan provides the measures required during the construction, operational and decommissioning phases of the pipeline to reduce the impact of the pipeline and pump station. Monitoring measures have also been included. 	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Rehabilitation Specialist.
Heritage Impact Assessment	<ul style="list-style-type: none"> A heritage impact assessment is not required for the proposed activity. No heritage resources were identified during the survey. This is likely due to the history of disturbance in the site-specific study area through the construction of the TEP and existing infrastructure; Considering the cultural landscape baseline, review of heritage studies completed within the general study area, the results of the pre-disturbance survey and understanding of the Project, Digby Wells is of the opinion that no further heritage assessment in terms of Section 38 of the NHRA is required; TEP must develop a project-specific Chance Find Protocol (CFP) and Fossil Finds Procedure (FFP) for implementation during construction activities, should such protocols not be included in the EMPr already; and 	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Heritage Specialist.

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the BAR	Reference to applicable section of report where specialist recommendations have been included
	<ul style="list-style-type: none"> TEP must immediately inform SAHRA of any chance finds identified and enlist the services of a qualified and accredited archaeologist and/or palaeontologist to assess and recommend appropriate mitigation measures as required. 		

16 Environmental Impact Statement

16.1 Summary of the Key Findings of the Environmental Impact Assessment

The Environmental Impact Statement is a summary of all the potential environmental impacts identified during each phase of the proposed project. The significance of the impacts associated with the biophysical environment, pre-mitigation and post-mitigation, is summarised below:

Project Activity	Aspects Affected	Potential Impact	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
Development and upgrading of a permanent access road to the site.	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Soil compaction; Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; Soil erosion (surface erosion, head cut erosion) and sediment release to wetlands; Alteration of topographies; and Soil contamination from hydrocarbon or hazardous substance spills and leakages. 	Construction Phase	Moderate Negative - 84	Minor Negative - 40
Construction of the pump station and the pipeline from the pump station to the Discard Disposal Facility solution trench.	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Removal of the soil changing the natural geomorphology; Soil erosion and sedimentation; Soil compaction and topsoil loss leading to reduced fertility; Soil contamination from spills from machinery as well as potential spills from the pipeline; Migration of soil contaminants into groundwater and contaminating surface water systems; and Decrease in land use and land capability (agricultural potential). 	Construction Phase	Moderate (negative) - 98	Minor (negative) - 60
	Wetlands	<ul style="list-style-type: none"> Wetland fragmentation; Water quality and quantity contamination and deterioration; 	Construction Phase	Moderate (negative)	Minor (negative)

Project Activity	Aspects Affected	Potential Impact	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
		<ul style="list-style-type: none"> Habitat and biodiversity loss; Increased Alien Invasive Plants (AIPs); Erosion and sedimentation of wetland areas; and Loss of wetland areas. 			
Topsoil stripping and stockpiling	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Compaction of soil and therefore increased surface runoff; Increased erosion on unprotected soils and consequently sedimentation as these soils is highly erodible; Removal of vegetation and top soil decreasing the soil fertility; and Compaction, ponding and changes to the natural hydrological functioning of the landscape. 	Construction Phase	Moderate (negative) - 105	Minor (negative) -72
	Wetlands	<ul style="list-style-type: none"> Erosion and sedimentation of wetland areas; and Water quality and quantity contamination and deterioration. 	Construction Phase	Moderate (negative) -91	Minor (negative) -55
Waste generation and removal of waste.	Soils, Land use and Land Capability	<ul style="list-style-type: none"> Soil contamination Decreased soil fertility and land capability; and Soil compaction. 	Construction Phase	Moderate (negative) - 84	Negligible (negative) - 32

16.2 Final Site Map

The final infrastructure layout map is included as Plan 4 in Appendix B.

16.3 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Refer to Section 12.7.

17 Proposed Impact Management Objectives and the Impact Management Outcomes for Inclusion in the EMPR

The EMPr seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment and surrounding communities will be mitigated, controlled and monitored. The key objectives of the EMP therefore are:

- To minimise the extent of an impact during the life of the project;
- To ensure appropriate restoration of areas affected by the project; and
- To prevent long term environmental degradation.

18 Aspects for Inclusion as Conditions of Authorisation

The EAP recommends the following conditions for the DMRE to consider for inclusion into the EA:

- The mitigation/enhancement measures contained in the attached specialist reports and EMPr must be adhered to;
- Develop the project-specific Chance Find Protocol (CFP) and Fossil Finds Procedure (FFP) for implementation during construction activities, should such protocols not be included in the EMPr already;
- TEP Financial Provision will be updated in the new Financial year of 2022, to which will incorporate the new activity;
- Annual Environmental Audits must be undertaken as set out in conditions for authorisation and license conditions;
- The Rehabilitation Plan will be implemented after the activity has been decommissioned; and
- A WUL in terms of Section 21 of the NWA must be issued by the DWS prior to the activity taking place.

The specialist studies and impact assessment have been based on the proposed preferred site layout for new proposed activities. Should there be any changes to the project description or site layout plan as provided, the adequacy and accuracy of the work may be affected, and additional studies may be required to assess the impacts of these proposed changes.

19 Description of any Assumptions, Uncertainties and Gaps in Knowledge

The following general assumptions are applicable to this BAR:

- The EMPr included in Part B of this report accounts for all activities applicable to the TEP Project to ensure one EMPr is utilised for effective implementation of the mitigation measures;
- The areas surveyed for various studies conducted were based on the preliminary infrastructure layout presented by TEP;
- The findings presented are based on professional experience, supported by a literature review, and extrapolated from the data collected at the time of field surveys conducted; and
- Representative sampling methods were employed for the studies conducted and therefore the possibility of gaps in the data gathered exists.

Table 19-1 below presents the assumptions, uncertainties, limitations and knowledge gaps to the various specialist studies undertaken, where relevant.

Table 19-1: Specialist Studies Assumptions, Uncertainties and Gaps

Specialist Study	Specialist Study
Soils, Land Use and Land Capability	<ul style="list-style-type: none"> • It was out of the scope of the report to do a detailed soil chemical and physical analysis. Soil characteristics and descriptions in the report were supported by previously data obtained from relevant resources (Digby Wells Environmental, 2019); • The area surveyed was based on the layout presented by TEP and the appointed contractor; • Land suited for crop production was assumed to be suitable for other, less intensive uses such as pasture, natural grazing, forestry and wildlife; • Soils are contiguous hence differentiation is not abrupt, and the transition zone cannot be completely captured during any given soil survey; • The soils within the capability classes are similar only with respect to the degree of limitations in soil use for agricultural purposes or with respect to the impact on the soils when they are so used; and • Soils situated within the 500 m buffer zone were assessed mostly on a desktop level with very limited ground-truthing.

Specialist Study	Specialist Study
Wetlands	<ul style="list-style-type: none"> • Wetland delineations were taken from a previously conducted report by Digby Wells (Digby Wells Environmental, 2019) and assumed to be correct; • Wetlands situated within the 500 m zone of regulation were assessed mostly on a desktop level with very limited ground-truthing; • This wetland study forms part of a BA process and should be read in conjunction with the BA process and other related specialist studies; • The Wetland Assessment was conducted during March 2021 having some restrictions to vegetation diversity, identification and low flows in the systems; and • No form of this report may be amended or extended without the prior written consent of the author and/or a relevant reference to the report by the inclusion of an appropriately detailed citation. Any recommendations, statements, or conclusions drawn from or based on this report must cite or reference this report. Whenever such recommendations, statements or conclusions form part of the main report relating to the current investigation, this report must be included in its entirety.

20 Reasoned Opinion as to Whether the Proposed Activity Should or Should Not be Authorised

20.1 Reasons why the Activity Should be Authorised or Not

Digby Wells recommends that the proposed activity be granted an EA, provided that the stipulated mitigation and management measures are implemented. The project area is surrounded by mining related activities and is located in an already disturbed area. The proposed project will not contribute to significant soil or water pollution, however, the proposed activity will limit and confine the contamination. No significant impacts as a result of the proposed project have been identified as long as the mitigation measures are implemented in accordance with Section 12.

20.2 Conditions that Must be Included in the Authorisation

The implementation of the mitigation measures provided in this report must be a condition of the authorisation. The following mitigation measures must be included into the authorisation:

- Recreate wetland habitat after construction of the pipeline. Ensure proper landscaping, shaping and revegetation;
- Improve vegetation cover and establish hydrophytic plants and facultative hydrophytes that are native to the area. If self-vegetation has not occurred in 3 months, re-seeding should be done;
- Reduce the risk of erosion, compaction and the creation of preferential flow paths;
- Maintain linear infrastructure, such as roads;
- Prevent contaminated water from entering the wetland. If spills or leakages from the pipeline occur, it should be cleaned up immediately;
- If any erosion occurs, corrective actions must be taken to minimise any further erosion from taking place;
- Runoff must be controlled and managed using proper stormwater management measures;
- Restrict vehicle movement over sensitive areas to reduce soil compaction;
- Do not rip/shape the area in the wet season;
- If soil is polluted, treat the soil using *in situ* bioremediation. If *in situ* treatment is not possible, then the polluted soil must be classified according to the National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN R635 of 23 August 2013) and disposed of at an appropriate, permitted or licensed disposal facility;
- All vehicles and machines must be parked within hardstanding areas and must be checked daily for leaks;
- Re-fuelling must take place on a sealed surface area away from soils to prevent seepage of hydrocarbons into the soil;
- Place drip trays where vehicles or machinery are parked;
- Fuel, grease and oil spills should be remediated using a commercially available emergency clean up kits;
- Any contractors on site must ensure that all employees are aware of the procedure for dealing with spills and leaks and undergo training on-site; and
- Establish effective soil cover, such as lawn grass around constructed infrastructure for adequate protection from wind and water erosion; and
- Minimise unnecessary removal of the natural vegetation cover outside the development footprint.

21 Period for which the Environmental Authorisation is Required

The EA is required for the construction and operation of the pump station and pipeline until the end of the Sasol Secunda Mining Right that expires in 2050.

22 Undertaking

An undertaking is provided at the end of the EMPr and is applicable to both the Part A and Part B of this report.

23 Financial Provision

TEP has R 9.5 million made available for the project. The annual financial provision will be updated once the project is completed at the end of the year to include the rehabilitation of the project at the end of life of mine.

23.1 Explain how the aforesaid amount was derived

TEP has not updated the financial provision to incorporate the new proposed activity. However, the proposed activity will be included in the new financial year of 2022.

23.2 Confirm that this amount can be provided for from operating expenditure

TEP confirms that the amount determined in Section 23 has been provided in the form of a bank guarantee. A liability assessment update will continue to be undertaken annually to ensure the financial provision is in line with the rehabilitation cost.

24 Specific Information required by the competent Authority

24.1 Impact on the socio-economic conditions of any directly affected person

The proposed activity has no impacts on the socio-economic. Please refer to Section 7.1.

25 Other matters required in terms of sections 24(4)(a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. For the proposed activity, no alternatives were considered.

Part B: Environmental Management Programme Report

1 Details of the Environmental Assessment Practitioner

The details of the EAP have been provided in Section 2.2 in Part A of this report.

2 Description of the Aspects of the Activity

The aspects of the activity that are covered by the EMP have been described Section 5.1 of Part A of this report.

3 Composite Map

The composite plan showing the extent of the infrastructure for the project area is included in Plan 13 in .

4 Determination of Closure Objectives

The closure objectives will be to rehabilitate disturbed areas to a land use that conforms to the generally accepted principle of sustainable development through restoration, remediation, rehabilitation and stabilisation as stated in the Rehabilitation Plan attached as Appendix F.

4.1 Volumes and Rate of Water Use Required for the Operation

TEP is in the process of applying for the WUL. The IWULA for the TEP aims to ensure that the water uses will remain lawful. In addition, the application aims to include the commencement of the proposed new water uses to be undertaken at TEP. The new water uses include:

- Section 21 (a): Taking water from a water resource which includes the abstraction of water from Wollie se Gat; and
- Section 21 (c) and(i): Rehabilitation of various areas located at the TEP which is located within 500 m of a wetland; and
- Section 21 (c) and (i): Construction of a pipeline from Wollie se Gat to the solution trench at the Discard Disposal Facility which is located within 500 m of a wetland.

Below is the table that summarises the new water uses of TEP that needs to be authorised.

Table 4-1: Proposed New Water Uses

Water Use	Activity	Volumes abstracted/ discharged per day	Property & Title Deeds	Coordinates
Section 21 (a)	a) Abstraction of water from groundwater (seepage)	68378	RE of Portion 7 of Goedehoop 290 IS	26°33'25.51"S 29°11'32.47"E
Section 21(c) and (i)	b) Wollie se Gat Pipeline and pump station	-	RE of Portion 7 of Goedehoop 290 IS	26°33'25.25"S 29°11'37.10"E

4.2 Has a water use licence has been applied for

The TEP is currently a holder of Block 3 Integrated Water Use Licence (IWUL) (Licence No. 08/C12D/ACEFGIJ/1274) which will expire in 2022. TEP has submitted a Water Use Licence Application in order to replace the existing WUL. A General Authorisation (GA) will be submitted for this operation.

5 Impacts to be mitigated in their respective phases

The proposed mitigation measures and its compliance with the relevant standards are presented in Table 5-1.

Table 5-1: Impacts to be Mitigated

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
Construction Phase						
Development and upgrading of a permanent access road to the site	Soil and Land Capability	Construction Phase	1 ha	<ul style="list-style-type: none"> If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Only the designated access routes are to be used to reduce any unnecessary compaction; Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential); Unused roads must be rehabilitated to prevent hardened surfaces; and Implement a stormwater management plant to prevent impacts from the roads to the soils (erosion, head-cut erosion, increased runoff, loss of soil, water ponding). 	<ul style="list-style-type: none"> NEMA NEM:WA CARA. NWA 	Construction Phase
	Wetlands	Construction Phase	1 ha	<ul style="list-style-type: none"> The footprint shall be contained to the immediate servitude and demarcated to prevent the movement of unauthorised vehicles into the wetlands; Keep to designated areas. Movement must be restricted to development footprint. Light vehicles should be used where possible; All movement of construction equipment shall be contained to one road and small servitude, not larger than 4 m. Where practically possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; and The footprint for the proposed activity shall be demarcated to prevent the unauthorised entrance to the wetlands. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and National Freshwater Ecosystems Priority Areas (NFEPA). 	Construction Phase
Clearing and grubbing of approximately 0.3 ha.	Soil and Land Capability	Construction Phase	0.3 ha	<ul style="list-style-type: none"> If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Bush clearing contractors will only clear bushes and trees larger than 0.5m the remaining vegetation will be stripped with the top 300 mm of topsoil (usable soil) 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<p>to conserve as much of the nutrient cycle, organic matter and seed bank as possible;</p> <ul style="list-style-type: none"> The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; Compaction of the removed and stockpiled usable soil must be avoided by prohibiting traffic on stockpiles; Stockpiles should only be used for their designated final purposes; and The stockpiles should be vegetated if standing longer than 1 month to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 		
	Wetlands	Construction Phase	0.3 ha	<ul style="list-style-type: none"> Vegetation clearance will be undertaken during the dry season where practically possible; Small equipment with rubber wheels shall be used to minimize the area of impact within the immediate wetland area; All movement must be contained to one road. Where practical possible, as little movement as possible within the wetland and catchment will take place; and Areas that are not self-vegetated within 3 months will be ripped, landscaped, and reseeded. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Construction Phase
Establishment of the laydown area and contractor's camp.	Soil and Land Capability	Construction Phase	1 ha	<ul style="list-style-type: none"> The laydown area shall be located in an already disturbed area, no new areas shall be cleared; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Ensure proper storm water management designs are in place; Only the designated access routes are to be used to reduce any unnecessary compaction; and Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Construction Phase
	Wetlands	Construction Phase	1 ha	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<ul style="list-style-type: none"> If the construction is going to take longer than 3 months, vegetate the areas to prevent erosion and loss of soil and sedimentation; and Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately. 	<ul style="list-style-type: none"> A Best-Practice Guideline for South Africa”; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	
Construction of the pump station and the pipeline from the pump station to the TEP Discard Facility solution trench.	Soil and Land Capability	Construction Phase	1 ha	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; All soil removed from the trench shall be stockpiled separately adjacent to the trench, within the 4 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. This shall be done to a maximum of 45 m servitude and vehicle movement restricted to the servitude; The area will be revegetated after construction if not self-vegetated within 3 months; Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas; Movement, stockpiling of brings and cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately; Place sediment trapping berms on the boundary of the 100 m buffer or end of development; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; Stockpiles should only be used for their designated final purposes; and The stockpiles should be vegetated if standing longer than 1 month to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Construction Phase
	Wetlands	Construction Phase	1 ha	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; 	<ul style="list-style-type: none"> NEM:BA; NEMA; 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<ul style="list-style-type: none"> Small equipment shall be used to minimize the area of impact within the immediate wetland area; All soil removed from the excavated areahall be stockpiled separately adjacent to the trench, but within the 4 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. The working servitude will be a maximum of 4 m wide and all vehicle movement shall be restricted to the servitude; The area will be revegetated after construction if not self-vegetated within 3 months; Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas; If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation; Movement, stockpiling and delivery of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately; and Place sediment trapping berms on the boundary of the 100 m buffer of the wetland, or at the edge of the development area. 	<ul style="list-style-type: none"> SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	
Installation of parking bays for the construction area and vehicles.	Soil and Land Capability	Construction Phase	TBC	<ul style="list-style-type: none"> Parking bays will be allocated in already disturbed and cleared areas outside wetland areas; Construction shall be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Ensure proper storm water management designs are in place; Only the designated access routes are to be used to reduce any unnecessary compaction; and Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Construction Phase
	Wetlands	Construction Phase	TBC	<ul style="list-style-type: none"> Parking bays will be constructed outside wetland areas and will be contained to already disturbed areas; Construction shall be undertaken during the dry season where practically possible; 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<ul style="list-style-type: none"> Small equipment shall be used to minimize the area of impact within the immediate wetland area; If the construction is going to take longer than 3 months, vegetate the areas to prevent erosion and loss of soil and sedimentation; and Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately. 	<ul style="list-style-type: none"> A Best-Practice Guideline for South Africa”; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA 	
Installation of temporary warning signage.	Soil and Land Capability	Construction Phase	TBC	<ul style="list-style-type: none"> Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. All movement must be contained to one road. Where practical possible, as little as possible movement within the wetlands and catchment will take place. If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Ensure proper storm water management designs are in place; Only the designated access routes are to be used to reduce any unnecessary compaction; and Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Construction Phase
	Wetlands	Construction Phase	TBC	<ul style="list-style-type: none"> Warning signage will be placed outside of wetland areas as far as possible; Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area; and All movement must be contained to one road. Where practical possible, as little movement as possible within the wetlands and catchment will take place. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on “Wetland offsets: A Best-Practice Guideline for South Africa”; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Construction Phase
Topsoil stripping and stockpiling.	Soil and Land Capability	Construction Phase	TBC	<ul style="list-style-type: none"> The topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; All stockpiles are to be kept to a maximum height of 4 m; Soil is to be stripped when the soil is dry, as to reduce compaction; 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<ul style="list-style-type: none"> If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; Compaction of the removed usable soil must be avoided by prohibiting traffic on stockpiles; Stockpiles should only be used for their designated final purposes; and The stockpiles should be vegetated to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 	<ul style="list-style-type: none"> NEM:WA; and CARA. 	
	Wetlands	Construction Phase	TBC	<ul style="list-style-type: none"> During the excavation, the topsoil must be stockpiled separate from the underlying material (B-horizon) to place the soil profile back in the original horizon-sequence; If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation; AIPs shall be controlled during and after the construction of the trench is completed; and No raw materials shall be stockpiled within the wetland, but shall be stockpiled in demarcated areas outside the wetland areas. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Construction Phase
Provision of sanitation facilities during the construction phase.	Soil and Land Capability	Construction Phase	TBC	<ul style="list-style-type: none"> Provide portable toilets for the personnel and provide trash cans all over the site outside wetland areas; Portable toilets shall not be placed within the wetlands; An agreement with a service provider shall be in place to service the portable toilets on a regular basis to prevent this from becoming a nuisance; All waste shall be removed at the end of each day; and If any spillage occurs, clean up and remediate immediately. 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Construction Phase
	Wetlands	Construction Phase	TBC	<ul style="list-style-type: none"> Provide portable toilets for the personnel and provide trash cans all over the site outside wetland areas; An agreement with a service provider shall be in place to service the portable toilets on weekly basis to prevent this from becoming a nuisance; and All waste shall be removed from site at the end of each week once construction activities are completed for the day. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
					<ul style="list-style-type: none"> DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	
Demarcation of the site using fencing and gates	Soil and Land Capability	Construction Phase	TBC	<ul style="list-style-type: none"> Movement and construction activities, will take place outside of the wetlands and no spillage will take place within the wetland area; No mixing of cement will take place on the soil; All movement must be contained to one road. Where practical possible, as little as possible movement within the wetlands and catchment will take place; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Ensure proper storm water drainage from infrastructure areas; Only the designated access routes are to be used to reduce any unnecessary compaction; and Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Construction Phase
	Wetlands	Construction Phase	TBC	<ul style="list-style-type: none"> Linear infrastructure will be placed outside of wetland areas as far as possible; Culverts and constructed trenches will be used to prevent fragmentation of wetlands; Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area; and All movement must be contained to one road. Where practical possible, as little movement as possible within the wetlands and catchment will take place. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); NFEPA. 	Construction Phase
Waste generation and removal of waste.	Soil and Land Capability	Construction Phase	TBC	<ul style="list-style-type: none"> All movement of construction equipment shall be contained to one road and small servitude; Waste removal trucks shall not be allowed to leave the demarcated road and enter any wetlands; Light vehicles should be used where possible; 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and 	Construction Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<ul style="list-style-type: none"> Waste will be disposed of at a registered landfill site; All waste shall be removed and stockpiled in one designated area; and If any spillage occurs, clean up and remediate immediately. 	<ul style="list-style-type: none"> VARA. 	
	Wetlands	Construction Phase	TBC	<ul style="list-style-type: none"> All movement of construction equipment shall be contained to one road and small servitude; Where practical possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; The footprint for the proposed activity shall be demarcated to prevent unauthorised entrance to the wetlands; All construction equipment and personnel shall keep to designated areas; Light vehicles should be used where possible. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Construction Phase
	Soil and Land Capability	Operational Phase	1 ha	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; and Where practically possible, as little as possible movement within the wetlands will take place and access of vehicles denied. 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Operational Phase
Maintenance of the pumps will be undertaken as required.	Wetlands	Operational Phase	Pipeline is 380 m in length	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; and Where practically possible, as little movement as possible within the wetlands will take place and access of vehicles to wetland areas will be denied. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Operational Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
All rubble and redundant material shall be removed from site to an appropriate licensed facility.	Soil and Land Capability	Decommissioning Phase	More than 1 ha	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; Waste will be stored outside the wetland and removed as quickly as possible from the site; All movement of construction equipment shall be contained to one road and small servitude; Waste will be disposed of at a registered landfill site; All waste shall be stockpiled in one designated area; and If any spillage occurs, clean up and remediate immediately. 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Decommissioning Phase
	Wetlands	Decommissioning Phase	More than 1 ha	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; Where practically possible, as little movement as possible within the wetlands will take place and access of vehicles to wetland areas will be denied; and Waste will be stored outside the wetland and removed as soon as possible from the site. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Decommissioning Phase
Areas where compaction has occurred will be ripped to allow the growth of vegetation.	Soil and Land Capability	Decommissioning Phase	More than 1 ha	<ul style="list-style-type: none"> Only rip at the end of the wet season/ beginning of the dry season to prevent breakdown of soil aggregates; Do not till/rip in the wet season as this will cause damage to the soil geomorphology as well as the equipment used; Rip to at least 400 mm to prevent deep compaction and therefore waterlogging of newly vegetated areas; Re-vegetate the area as soon as ripping has occurred to prevent soils to be exposed for long periods. The vertic soils are highly susceptible to erosion; Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; Implement a AIPs program to prevent proliferation of AIPs and deterioration of soil fertility; and 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Decommissioning Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
				<ul style="list-style-type: none"> Avoid creating narrow preferential flow paths as the this could lead to erosion gullies as the soils are susceptible to erosion. 		
	Wetlands	Decommissioning Phase	More than 1 ha	<ul style="list-style-type: none"> Erection of sediment trapping berms around (100 m buffer) the wetland areas to prevent sedimentation of wetland areas during the rehabilitation of the site; Shaping of landscape should be performed in a manner that will allow water to drain freely towards wetland areas, as far as practicable possible; If self-vegetation has not occurred within 3 months of the work, seeding has to be done; Implement a AIPs program to prevent proliferation of AIPs; Avoiding creating narrow preferential flow paths as the this could lead to erosion; and As far as possible, conduct work during the dry season. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); Wetland Management Series (published by Water Research Commission (2007); and NFEPA. 	Decommissioning Phase
Area shall be shaped and contoured to mimic its surrounding areas and to encourage the recovering and continuity of the wetland vegetation.	Soil and Land Capability	Decommissioning Phase	More than 1 ha	<ul style="list-style-type: none"> Only reshape and work the land at the end of the wet season/ beginning of the dry season to prevent breakdown of soil aggregates; Do not till/rip/shape in the wet season as this will cause damage to the soil geomorphology as well as the equipment used; Re-vegetate the area as soon as ripping has occurred to prevent soils to be exposed for long periods. The vertic soils are highly susceptible to erosion; Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; Avoid creating narrow preferential flow paths as the this could lead to erosion gullies as the soils are susceptible to erosion; and Rehabilitation work should be performed during the dry season, unless it is highly urgent and could be detrimental to health of wetland areas. 	<ul style="list-style-type: none"> Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation; NEMA; NEM:WA; and CARA. 	Decommissioning Phase
	Wetlands	Decommissioning Phase	More than 1 ha	<ul style="list-style-type: none"> Shaping of landscape should be performed in a manner that will allow water to drain freely towards wetland areas; If self-vegetation has not occurred within 3 months of the work, seeding has to be done; Implement a AIPs program to prevent proliferation of AIPs; Avoiding creating narrow preferential flow paths as the this could lead to erosion; and As far as possible, conduct work during the dry season. Rehabilitation work should be performed during the dry season, unless it is highly urgent and could be detrimental to the health of wetland areas. 	<ul style="list-style-type: none"> NEM:BA; NEMA; SANBI, in collaboration with the DWS report on "Wetland offsets: A Best-Practice Guideline for South Africa"; DWAF Guidelines for the Delineation of Wetlands (2005); 	Decommissioning Phase

Activities	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation type	Compliance with Law or Standards	Time Period for Implementation
					<ul style="list-style-type: none"> • Wetland Management Series (published by Water Research Commission (2007); and • NFEPA. 	

6 Impact management outcomes

A description of objectives and outcomes of the Environmental Management Plan is outlined in Table 6-1, taking into account the impact and mitigation type.

Table 6-1: Summary of Impact Management Outcomes

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To reduce negative impacts on soil and land capability in terms of soil compaction, erosion, and contamination as a result of the development and upgrading of the access road	<ul style="list-style-type: none"> • Soil compaction; • Reduced infiltration rate, reduced rooting depth (vegetation cover) and increased surface runoff; • Soil erosion (surface erosion, head cut erosion) and sediment release to wetlands; • Alteration of topographies; and • Soil contamination from hydrocarbon or hazardous substance spills and leakages. 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> • Only the designated access routes are to be used to reduce any unnecessary compaction; • Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential); • Unused roads must be rehabilitated to prevent hardened surfaces; and • Implement a stormwater management plan to prevent impacts from the roads to the soils (erosion, head-cut erosion, increased runoff, loss of soil, water ponding). • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • Bush clearing contractors to clear bushes and trees larger than 0.5m and the remaining vegetation should be stripped with the top 300 mm of topsoil (usable soil) to conserve as much of the nutrient cycle, organic matter and seed bank as possible; • The handling of the stripped usable soil to be minimised to ensure the soil's structure does not deteriorate significantly; • Compaction of the removed and stockpiled usable soil must be avoided by prohibiting traffic on stockpiles; • Stockpiles should only be used for their designated final purposes; and • The stockpiles should be vegetated if standing longer than 1 month to reduce the risk of erosion, prevent weed growth and to reinstate the ecological processes within the soil. 	<ul style="list-style-type: none"> • A stable landform is created around the access roads which does not result in soil erosion; • No water ponding occurs; and • Soil contamination is minimised and any contaminated soil is removed.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To assess the potential negative impact of wetland fragmentation, water quality deterioration as a result of development and upgrading of the access road	<ul style="list-style-type: none"> Wetland fragmentation; Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; and Loss of wetland areas. 	Wetlands	Construction Phase	<ul style="list-style-type: none"> The footprint shall be contained to the immediate servitude and demarcated to prevent the movement of unauthorised vehicles into the wetlands; Keep to designated areas. Movement must be restricted to development footprint. Light vehicles should be used where possible; All movement of construction equipment shall be contained to one road and small servitude, not larger than 4 m. Where practically possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; and The footprint for the proposed activity shall be demarcated to prevent the unauthorised entrance to the wetlands. 	<ul style="list-style-type: none"> A stable hydrological regime of the wetland;and An improvement of the surface water quality
To minimise the potential negative impact of direct loss of biodiversity and habitat within the wetland during the clearing and grubbing of the vegetation	<ul style="list-style-type: none"> Direct loss of wetland areas; Habitat loss; Loss of biodiversity; and Erosion and sedimentation of wetland areas. 	Wetlands	Construction Phase	<ul style="list-style-type: none"> Vegetation clearance will be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; All movement must be contained to one road. Where practical possible, as little movement as possible within the wetland and catchment will take place; and Areas that are not self-vegetated within 3 months will be ripped, landscaped, and reseeded. 	<ul style="list-style-type: none"> A stable hydrological regime of the wetland.
To minimise the potential negative impact on the soil and land capability during the establishment of the laydown area and the contractors camp	<ul style="list-style-type: none"> Soil compaction; Soil erosion and sedimentation; and Soil contamination. 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> The laydown area shall be located in an already disturbed area, no new areas shall be cleared; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Ensure proper storm water management designs are in place; Only the designated access routes are to be used to reduce any unnecessary compaction; and Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 	<ul style="list-style-type: none"> A stable landform is created around the laydown area and contractors camp which does not result in soil erosion; and No water ponding occurs.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To minimise the direct loss of biodiversity and habitat within the 500m buffer of a wetland during the establishment of the laydown area and contractors camp	<ul style="list-style-type: none"> Indirect loss of wetland areas; Habitat loss; Loss of biodiversity; and Erosion and sedimentation of wetland areas. 	Wetlands	Construction Phase	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; If the construction is going to take longer than 3 months, vegetate the areas to prevent erosion and loss of soil and sedimentation; and Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately. 	<ul style="list-style-type: none"> A stable landform is created around the laydown area and contractors camp which does not result in soil erosion; and No water ponding occurs.
To assess the potential negative impact on the soil and land capability in terms of soil contamination during the construction of the pump station and the pipeline	<ul style="list-style-type: none"> Removal of the soil changing the natural geomorphology; Soil erosion and sedimentation; Soil compaction and topsoil loss leading to reduced fertility; Soil contamination from spills from machinery as well as potential spills from the pipeline; Migration of contaminants into groundwater and contaminate surface water systems; and Decrease in land use and land capability (agricultural potential). 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; All soil removed from the trench shall be stockpiled separately adjacent to the trench, within the 4 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. This shall be done to a maximum of 45 m servitude and vehicle movement restricted to the servitude; The area will be revegetated after construction if not self-vegetated within 3 months; Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas; Movement, stockpiling of brings and cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately; Place sediment trapping berms on the boundary of the 100 m buffer or end of development; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; 	<ul style="list-style-type: none"> Soil contamination is minimised, and any contaminated soil to be removed.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
				<ul style="list-style-type: none"> The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; Stockpiles should only be used for their designated final purposes; and The stockpiles should be vegetated if standing longer than 1 month to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 	
<p>To reduce the potential negative impact of water quality deterioration, habitat loss, biodiversity and fragmentation loss on the wetland during the construction of the pump station and the pipeline</p>	<ul style="list-style-type: none"> Wetland fragmentation; Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; Increased AIPs; Erosion and sedimentation of wetland areas; and Loss of wetland areas. 	<p>Wetlands</p>	<p>Construction Phase</p>	<ul style="list-style-type: none"> Excavation shall be undertaken during the dry season where practically possible; Small equipment shall be used to minimize the area of impact within the immediate wetland area; All soil removed from the trench shall be stockpiled separately adjacent to the trench, but within the 4 m servitude area. A new road will have to be constructed and vegetation cleared to connect the existing road to the new construction area. The working servitude will be a maximum of 4 m wide and all vehicle movement shall be restricted to the servitude; The area will be revegetated after construction if not self-vegetated within 3 months; Conserve the topsoil so that it can be used for the rehabilitation of the disturbed areas; If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation; Movement, stockpiling and delivery of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately; and Place sediment trapping berms on the boundary of the 100 m buffer of the wetland, or at the edge of the development area. 	<ul style="list-style-type: none"> A stable hydrological regime of the wetland will be created; and Water quality deterioration of the wetland will be minimised.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To reduce negative impacts on soil and land capability in terms of soil compaction, erosion, and contamination as a result of the installation of parking bays for construction of vehicles	<ul style="list-style-type: none"> • Soil compaction; • Soil erosion and sedimentation; and • Soil contamination. 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> • Parking bays will be allocated in already disturbed and cleared areas outside wetland areas; • Construction shall be undertaken during the dry season where practically possible; • Small equipment with shall be used to minimize the area of impact within the immediate wetland area; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • Ensure proper storm water management designs are in place; • Only the designated access routes are to be used to reduce any unnecessary compaction; and • Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential). 	<ul style="list-style-type: none"> • A stable landform is created around the parking bays which won't result in soil erosion; and • Surface water runoff will be contained into the storm water measures; and • Soil contamination will be minimised.
To reduce the potential negative impact of wetland fragmentation and erosion during the installation of parking bays for the construction vehicles	<ul style="list-style-type: none"> • Wetland fragmentation; and • Erosion and sedimentation of wetland areas. 	Wetlands	Construction Phase	<ul style="list-style-type: none"> • Parking bays will be constructed outside wetland areas and will be contained to already disturbed areas; • Construction shall be undertaken during the dry season where practically possible; • Small equipment shall be used to minimize the area of impact within the immediate wetland area; • If the construction is going to take longer than 3 months, vegetate the areas to prevent erosion and loss of soil and sedimentation; and • Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area. If any spillage occurs, it will be dealt with immediately. 	<ul style="list-style-type: none"> • A stable landform is created around the parking bays; • Surface water runoff will be contained into the storm water measures.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
<p>To reduce the potential impact on the soil and land capability in terms of the soil compaction, water ponding and changes of the natural hydrological functioning of the landscape during the topsoil stripping and stockpiling</p>	<ul style="list-style-type: none"> • Compaction of soil and therefore increased surface runoff; • Increased erosion on unprotected soils and consequently sedimentation as these soils is highly erodible; • Removal of vegetation and top soil decreasing the soil fertility; and • Compaction, ponding, and changes to the natural hydrological functioning of the landscape 	<p>Soil and Land Capability</p>	<p>Construction Phase</p>	<ul style="list-style-type: none"> • The topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; • Soil is to be stripped when the soil is dry, as to reduce compaction; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; • The handling of the stripped usable soil will be minimised to ensure the soil's structure does not deteriorate significantly; • Compaction of the removed usable soil must be avoided by prohibiting traffic on stockpiles; • Stockpiles should only be used for their designated final purposes; and • The stockpiles should be vegetated to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. 	<ul style="list-style-type: none"> • A stable landscape will be created around the area where topsoil and stripping will take place; and • No water ponding occurs.
<p>To minimise the potential negative impact of erosion, sedimentation and contamination on the wetland during the topsoil stripping and stockpiling</p>	<ul style="list-style-type: none"> • Erosion and sedimentation of wetland areas; and • Water quality and quantity contamination and deterioration 	<p>Wetlands</p>	<p>Construction Phase</p>	<ul style="list-style-type: none"> • During the excavation, the topsoil must be stockpiled separate from the underlying material (B-horizon) to place the soil profile back in the original horizon-sequence; • If the construction is going to take longer than 3 months, vegetate the stockpiles to prevent erosion and loss of soil and sedimentation; • AIPs shall be controlled during and after the construction of the trench is completed; and • No raw materials shall be stockpiled within the wetland, but shall be stockpiled in demarcated areas outside the wetland areas. 	<ul style="list-style-type: none"> • Water contamination will be minimised around the wetland; and • A stable landscape will be created around the wetland where topsoil and stripping will take place.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To reduce the potential negative impact on soil and land capability in terms of the soil and water contamination around the mobile sanitation facilities	<ul style="list-style-type: none"> Soil and water contamination 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> Provide portable toilets for the personnel and provide trash cans all over the site outside wetland areas; Portable toilets shall not be placed within the wetlands; An agreement with a service provider shall be in place to service the portable toilets on a regular basis to prevent this from becoming a nuisance; All waste shall be removed at the end of each day; and If any spillage occurs, clean up and remediate immediately. 	<ul style="list-style-type: none"> Water contamination will be minimised around the wetland.
To minimise the potential negative impacts of the water quality and quantity deterioration on the wetland around the mobile sanitation facilities	<ul style="list-style-type: none"> Water quality and quantity contamination and deterioration 	Wetlands	Construction Phase	<ul style="list-style-type: none"> Provide portable toilets for the personnel and provide trash cans all over the site outside wetland areas; An agreement with a service provider shall be in place to service the portable toilets weekly to prevent this from becoming a nuisance; and All waste shall be removed from site at the end of each week once construction activities are completed for the day. 	<ul style="list-style-type: none"> Water contamination will be minimised.
To reduce negative impacts on soil and land capability in terms of soil compaction, erosion and contamination as a result of demarcation of the site using fencing and gates	<ul style="list-style-type: none"> Soil compaction; Soil erosion and sedimentation; and Soil contamination. 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> Movement and construction activities, will take place outside of the wetlands and no spillage will take place within the wetland area; No mixing of cement will take place on the soil; All movement must be contained to one road. Where practical possible, as little as possible movement within the wetlands and catchment will take place; If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; Ensure proper storm water management designs are in place; Only the designated access routes are to be used to reduce any unnecessary compaction; and <p>Compacted areas are to be ripped to loosen the soil structure to increase the land capability (vegetation growth potential).</p>	<ul style="list-style-type: none"> A stable landform is created around the access roads which does not result in soil erosion; No water ponding occurs; and Soil contamination is minimised and any contaminated soil is removed.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To reduce the potential negative impact of wetland fragmentation and erosion as a result of demarcation of fencing and gates	<ul style="list-style-type: none"> Wetland fragmentation; and Erosion and sedimentation of wetland areas. 	Wetlands	Construction Phase	<ul style="list-style-type: none"> Linear infrastructure will be placed outside of wetland areas as far as possible; Culverts and constructed trenches will be used to prevent fragmentation of wetlands; Movement and construction activities, such as mixing of cement will take place outside of the wetlands and no spillage will take place within the wetland area; and All movement must be contained to one road. Where practical possible, as little movement as possible within the wetlands and catchment will take place. 	<ul style="list-style-type: none"> A stable landform is created around the fenced areas.
To reduce negative impacts on soil and land capability in terms of soil contamination, fertility and compaction as a result of waste generation and removal of waste	<ul style="list-style-type: none"> Soil contamination Decreased soil fertility, and land capability; and Soil compaction. 	Soil and Land Capability	Construction Phase	<ul style="list-style-type: none"> All movement of construction equipment shall be contained to one road and small servitude; Waste removal trucks shall not be allowed to leave the demarcated road and enter any wetlands; Light vehicles should be used where possible; Waste will be disposed of at a registered landfill site; All waste shall be removed and stockpiled in one designated area; and <p>If any spillage occurs, clean up and remediate immediately.</p>	<ul style="list-style-type: none"> A stable landform is created around the area where waste bins will be kept; and Soil contamination is minimised and any contaminated soil is removed.
To reduce the potential negative impact of water quality deterioration, habitat and biodiversity loss of the wetland as a result of waste generation and removal of waste	<ul style="list-style-type: none"> Water quality and quantity contamination and deterioration; Habitat and biodiversity loss; Erosion and sedimentation of wetland areas; and Loss of wetland areas. 	Wetlands	Construction Phase	<ul style="list-style-type: none"> All movement of construction equipment shall be contained to one road and small servitude; Where practical possible, as little movement as possible within the wetlands will take place and the width of the servitude shall not be increased where the wetlands are located; The footprint for the proposed activity shall be demarcated to prevent unauthorised entrance to the wetlands; All construction equipment and personnel shall keep to designated areas; Light vehicles should be used where possible; and 	<ul style="list-style-type: none"> A stable hydrological regime of the wetland; and Improve the surface water quality.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To minimise the potential negative impact on the soil and land capability in terms of soil compaction, erosion and contamination.	<ul style="list-style-type: none"> Soil compaction; Soil erosion due to increased runoff; and Soil contamination due to spillage from pump and vehicles. 	Soil and Land Capability	Operational Phase	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; and Where practically possible, as little as possible movement within the wetlands will take place and access of vehicles denied. 	<ul style="list-style-type: none"> Soil contamination will be minimised.
To minimise the potential negative impact on the wetland in terms of soil erosion and siltation of the wetland and surface water resources as a result of maintenance of a pump station	<ul style="list-style-type: none"> Soil erosion due to increased surface water runoff; Siltation of surface water resources leading to deteriorated water quality and quantity; Siltation of wetlands due to erosion; and Change in habitat and potential change in species composition. 	Wetlands	Operational Phase	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; and Where practically possible, as little movement as possible within the wetlands will take place and access of vehicles to wetland areas will be denied. 	<ul style="list-style-type: none"> A stable hydrological regime of the wetland.
To minimise the potential negative impact on the soil and land capability in terms of soil compaction, erosion as a result of rubble and redundant material to be removed on site	<ul style="list-style-type: none"> Soil compaction; and Soil erosion and sedimentation leading to loss of soil. 	Soil and Land Capability	Decommissioning Phase	<ul style="list-style-type: none"> Keep to designated areas. Movement must be restricted to development footprint; Light vehicles should be used where possible; All movement of personnel and light vehicles shall be contained to one road; Waste will be stored outside the wetland and removed as quickly as possible from the site; All movement of construction equipment shall be contained to one road and small servitude; Waste will be disposed of at a registered landfill site; All waste shall be stockpiled in one designated area; and <p>If any spillage occurs, clean up and remediate immediately.</p>	<ul style="list-style-type: none"> A stable landform is created around the area which does not result in soil erosion.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To minimise the potential negative impact on the wetland in terms of soil erosion and siltation of the wetland and change in habitat as a results of rubble and redundant material to be removed on site	<ul style="list-style-type: none"> • Soil erosion due to surface runoff/soil compaction; • Siltation of surface water resources leading to deteriorated water quality and quantity; and • Change in habitat and potential change in species composition. 	Wetland	Decommissioning Phase	<ul style="list-style-type: none"> • Keep to designated areas. Movement must be restricted to development footprint; • Light vehicles should be used where possible; • All movement of personnel and light vehicles shall be contained to one road; • Where practically possible, as little movement as possible within the wetlands will take place and access of vehicles to wetland areas will be denied; and • Waste will be stored outside the wetland and removed as soon as possible from the site 	<ul style="list-style-type: none"> • A stable hydrological regime of the wetland; and • Restored and rehabilitated area.
To minimise the potential negative impact around the on the soil and land capability as a result of the soil erosion, changes in habitat and siltation of surface water due to areas where compaction has occurred	<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Sedimentation of wetlands and low lying areas leading to deteriorated water quality and quantity and loss of vegetation cover; • Change in habitat and potential change in species composition – increased AIPs; and • Deep soil compaction and loss of soil structure due to the high clay content of the soils 	Soil and Land Capability	Decommissioning Phase	<ul style="list-style-type: none"> • Only rip at the end of the wet season/ beginning of the dry season to prevent breakdown of soil aggregates; • Do not till/rip in the wet season as this will cause damage to the soil geomorphology as well as the equipment used; • Rip to at least 400 mm to prevent deep compaction and therefore waterlogging of newly vegetated areas; • Re-vegetate the area as soon as ripping has occurred to prevent soils to be exposed for long periods. The vertic soils are highly susceptible to erosion; • Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; • Implement a AIPs program to prevent proliferation of AIPs and deterioration of soil fertility; and • Avoid creating narrow preferential flow paths as the this could lead to erosion gullies as the soils are susceptible to erosion. 	<ul style="list-style-type: none"> • A stable landform is created around the compaction area, which won't result in soil erosion or change in habitat for species.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
To minimise the potential negative impact around the wetland in terms of the soil erosion, changes in habitat and siltation of surface water due to areas where compaction has occurred	<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Siltation of surface water resources leading to deteriorated water quality and quantity; • Change in habitat and potential change in species composition; and • Increased AIPs. 	Wetland	Decommissioning Phase	<ul style="list-style-type: none"> • Erection of sediment trapping berms around (100 m buffer) the wetland areas to prevent sedimentation of wetland areas during the rehabilitation of the site; • Shaping of landscape should be performed in a manner that will allow water to drain freely towards wetland areas, as far as practicable possible; • If self-vegetation has not occurred within 3 months of the work, seeding has to be done; • Implement a AIPs program to prevent proliferation of AIPs; • Avoiding creating narrow preferential flow paths as the this could lead to erosion; and • As far as possible, conduct work during the dry season. 	<ul style="list-style-type: none"> • Stable landscape and hydrological regime of the wetland.
To reduce the potential negative impact of soil erosion, proliferation of AIP on the soil and land capability at the area to be shaped and contoured to mimic its surrounding areas and to encourage the recovery and continuity of the wetland vegetation	<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Soil geomorphological changes (loss of structure, fertility, Organic Material (OM); and • Proliferation of AIPs. 	Soil and Land Capability	Decommissioning Phase	<ul style="list-style-type: none"> • Only reshape and work the land at the end of the wet season/ beginning of the dry season to prevent breakdown of soil aggregates; • Do not till/rip/shape in the wet season as this will cause damage to the soil geomorphology as well as the equipment used; • Re-vegetate the area as soon as ripping has occurred to prevent soils to be exposed for long periods. The vertic soils are highly susceptible to erosion; • Shaping of landscape should be performed in a manner the will water to drain freely towards wetland areas; • Avoid creating narrow preferential flow paths as the this could lead to erosion gullies as the soils are susceptible to erosion; and • Rehabilitation work should be performed during the dry season, unless it is highly urgent and could be detrimental to health of wetland areas. 	<ul style="list-style-type: none"> • Stable landscape around the wetland area will be possible; and • Restored and rehabilitated area where the pipeline was decommissioned.

Objectives	Potential impacts	Aspects affected	Phase	Mitigation type	Impact Management Outcomes
<p>To reduce the potential impact on the wetland in terms of the soil erosion, change in habitat and increased AIPs on the area to be shaped and contoured to mimic its surrounding areas and to encourage the recovery and continuity of the wetland vegetation</p>	<ul style="list-style-type: none"> • Soil erosion due to wind and surface water runoff; • Change in habitat and potential change in species composition; and • Increased AIPs. 	<p>Wetland</p>	<p>Decommissioning Phase</p>	<ul style="list-style-type: none"> • Shaping of landscape should be performed in a manner that will allow water to drain freely towards wetland areas; • If self-vegetation has not occurred within 3 months of the work, seeding has to be done; • Implement a AIPs program to prevent proliferation of AIPs; • Avoiding creating narrow preferential flow paths as the this could lead to erosion; and • As far as possible, conduct work during the dry season. Rehabilitation work should be performed during the dry season, unless it is highly urgent and could be detrimental to the health of wetland areas. 	<ul style="list-style-type: none"> • Stable landscape around area where the pipeline and pump station was decommissioned; and • Restored and rehabilitated area.

7 Financial provision

7.1 Determination of the amount of Financial Provision

The TEP will be updating the Rehabilitation Strategy and Implementation Programme (RSIP) 2020 to include the propose project in the existing financial Provision. A budget of R9.5 million has been made available the project.

7.1.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation

The RSIP Objectives for the TEP is as follows:

- Determine the current status of the infrastructure and water resource impacts at the TEP;
- Determine the remediation objectives which are in accordance with the proposed future use of the area;
- Minimise impacts on surface and groundwater pollution;
- Improve aesthetics;
- Develop an action plan to give effect to the applicable rehabilitation commitments in the WUL conditions; and
- Ensure the safety of people and animals during operations and post closure.
- Develop an action plan to give effect to the determination of reasonable and achievable rehabilitation objectives which are in accordance with the anticipated future land;
- Develop an action plan for the implementation of the applicable rehabilitation commitments stipulated in the WUL conditions.

7.1.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

The Rehabilitation Plan was made available for public review and comment together with this Draft BAR (please refer to Appendix F). All comments received that pertain to the Rehabilitation Plan will be recorded in the Final BAR.

7.1.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

A Rehabilitation Plan for the proposed activity has been compiled for the proposed project and is provided in Appendix F

7.1.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The Rehabilitation Plan has been compiled in support of the primary closure objectives which are to remove infrastructure and rehabilitate the land to a suitable sustainable land use which provides a safe and stable environment for surrounding receptors.

7.1.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

The TEP has R9.5 million made available for the project. The financial provision will be updated once the project is completed at the end of the year to include the rehabilitation of the project at the end of life of mine.

7.1.6 Confirm that the financial provision will be provided as determined

The TEP has made provision for closure as legally required, however, this will be updated in the year 2022 to reflect the new proposed activity. A liability assessment update will continue to be undertaken annually to ensure the financial provision is in line with the closure cost.

8 Monitoring compliance with and performance assessment

The TEP has a monitoring programme in place as shown in Table 8-1, which was provided to Digby Wells. The TEP will be responsible for the implementation of the monitoring of mitigation and management measures, as well as compliance with the EMP.

8.1 Monitoring of Impact Management Actions

The TEP considers environmental monitoring essential in determining the status quo of the surface- and groundwater and aquatic environments present in the catchment. This will enable the operations to monitor their impact on the receiving environment throughout the various phases of the projects.

The operations have implemented the following monitoring programmes:

- Surface water;
- Groundwater (including model update and decant studies);
- Bio-monitoring (wet and dry season data available); and
- Dust monitoring.

For the proposed activity, no additional monitoring is required.

8.2 Monitoring and reporting frequency

Table 8-1 discussed the monitoring and reporting frequency for the management of impacts.

8.3 Responsible persons

The SSO undertakes all monitoring in terms of the TEP Monitoring Programme that was compiled for the operations.

8.4 Time period for implementing impact management actions

Table 8-1 captures the time period for implementing the impact management actions.

8.5 Mechanism for monitoring compliance

TEP has provided Digby Wells with an existing monitoring programme which is currently ongoing. The method for monitoring the impact management actions, the frequency of monitoring of the implementation of actions and the location of monitoring has been summarised in Table 8-1.

Table 8-1: Monitoring Plan

Type of monitoring	Parameter	Location	Frequency				Start Date	Comment
			D	M	Q	Y		
Soil								
Visual inspection	Soil erosion	Rehabilitated surfaces e.g. topsoil stockpiles, overburden dump			X			
Composite sampling of soils	Fertility of the soils	Topsoil stockpiles						This will be done prior to the decommissioning and closure of the mine
Flora								
Alien invasive species	Declared weeds and alien species	Disturbed areas and rehabilitated areas			X			
Water Quality								
Surface water quality	pH, EC, TDS, Ca, Mg, SO ₄ , Na, Cl, K, NO ₃ , NH ₄ Fe, Mn, Al, Pb, M-Alk, P-Alk, F			X				PO ₄ on request
Emergency Monitoring	pH, EC, TDS, Ca, Mg, SO ₄ , Na, Cl, K, NO ₃ , NH ₄ Fe, Mn,	Overflow of water pollution control dams	X					During periods of high rainfall exceeding 1:50 year flood event resulting

Type of monitoring	Parameter	Location	Frequency				Start Date	Comment
			D	M	Q	Y		
	Al, Pb, M-Alk, P-Alk, F							in the overflow of the pollution control dams
		Downstream points from the water pollution control dam	X					
Groundwater								
Groundwater quality	pH, EC, TDS, Ca, Mg, SO ₄ , Na, Cl, K, NO ₃ , NH ₄ Fe, Mn, Al, Pb, M-Alk, P-Alk, F	Selected boreholes			X			
Air Quality								
Dust monitoring	Dust	To be determined for new infrastructure						For new infrastructure or when complaints have been received
Noise	Background noise	To be determined for new infrastructure						This will be done before construction a new ventilation shaft.

9 Indicate the frequency of the submission of the performance assessment/ environmental audit report

In accordance with the EIA Regulations, 2014 (as amended), an external independent Environmental Audit will be undertaken every year. The Environmental Audit Report will be submitted to the DMRE and other relevant authorities where required.

10 Environmental Awareness Plan

10.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

Section 39 of the MPRDA requires the TEP to develop an environmental awareness plan to inform the employees of any environmental risks which may result from their work. In addition to this environmental awareness training has been identified during the BA Process as a mitigatory measure to prevent and minimise impacts on the receiving environment. The TEP recognises the role of the environmental awareness plan in preventing and minimising its impacts from mining operations on the environment.

Therefore the objectives of the environmental awareness plan will be:

- To educate employees regarding their role in conserving the environment and the importance of conserving natural resources;
- To identify environmental training needs for employees and contractors at all levels;
- To ensure that employees whose work could cause significant environmental impact as identified by the mine are competent to perform those tasks to which they are assigned;
- To enable employees to identify environmental impacts or non-conformances of their work activities on the environment;
- To familiarise employees with emergency preparedness and response requirements;
- To be aware of the potential consequences of deviation from specified operating procedures; and
- To conduct their work and manage mining activities in an environmentally responsible manner.

10.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

An Emergency Response Plan has been developed and is the approach used by the TEP to respond to risks that may pollute or degrade the environment during the establishment, operational and closure and rehabilitation phases.

10.3 General Environmental Awareness Training and Requirements

This Environmental Awareness Plan has been prepared by the TEP as part of the 2010 EIA Process.

10.3.1 Induction training

All new employees and contractors who will be doing work on the mine will undergo induction training. It is therefore suggested that basic environmental training should form part of this training. All existing and new employees will undergo annual induction training when they need to renew their Red Ticket and undergo an annual medical check up.

The induction training will be a broad introduction to what the environment is and the reasons why it is important to conserve the animals, plants, water and other natural resources. The training will include topics but shall not be limited to the following:

- What activities can impact on the environment?
- Type of impacts associated with mining activities.
- Employees' responsibility and role in conserving the environment.
- Actions that will be needed to prevent or minimise the impacts.
- Waste management.
- Water conservation.
- Emergency response and preparedness procedures.
- Etc.

10.3.2 Other training

Once the employees are trained in the basic environmental aspects more detailed training will be provided on other aspects as they become required but could include but shall not be limited to:

- Waste management (recycling, reusing);
- Spill kit training;
- Conservation of natural resources (water, electricity, oil).

This training will be applicable to employees working in areas where these topics are of importance.

10.3.3 Environmental awareness training

Awareness training of employees will be conducted featuring different environmental topics on a monthly basis. These topics will be discussed at their toolbox talks, shift meetings and posted on the notice boards for everyone to see.

These topics will summarise an issue and/or an incident that occurred during the previous month, e.g. the pollution control dam overflowed due to poor housekeeping and maintenance. This method will also be used to disseminate information at the grass root level in an effective and sufficient manner.

10.3.4 Frequency of Training

The frequency of training will be determined by the need for continues training. It is proposed that all employees will be scheduled for annual induction training. Other training will be conducted on an ad hoc basis, which will be determined by the need for specific training, e.g. spill kit training will be conducted when a new spill response team is appointed. High awareness regarding the environment among employees will be sustained through the use of monthly environmental topics. These topics could summarise themes from the induction training, or it could be based on the normal seasonal trends such as dry periods and the conservation of water and prevention of fires.


11 Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually)

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by National Environmental Management Act, 1998, (Act No. 107 of 1998), as amended, (NEMA) which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually. Undertaking

The EAP herewith confirms:-

- 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
- the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

Signature of the Environmental Assessment Practitioner:	
Name of Company:	Digby Wells Environmental
Date:	April 2021

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Appendix A: Details of the EAP



Appendix B: Plans

Plan 1: Regional Setting

Plan 2: Local Setting

Plan 3: Land Tenure Map

Plan 4: Infrastructure Map

Plan 5: Topographic Map of the Project Area

Plan 6: Slope of the Project Area

Plan 7: Geology of the Project Area

Plan 8 Soil Type Delineated

Plan 9: Regional Vegetation of the Project Area

Plan 10: Wetland Delineation of the Project Area

Plan 11: Pre-disturbance Survey

Plan 12: Land Uses of the Project Area

Plan 13: Composite Map



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Appendix C: Wetlands Impact Assessment



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Appendix D: Soil Impact Assessment



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Appendix E: Heritage Impact Assessment



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Appendix F: Rehabilitation Plan