SCOPING SOIL, LAND USE, AND LAND CAPABILITY ASSESSMENT: FOR THE PROPOSED 88KV SAR ROOIKOP POWERLINE DEVIATION WITHIN THE EKURHULENI METROPOLITAN MUNICIPALITY IN GAUTENG PROVINCE.

REF: AGR_SAR ROOIKOP_24

SUBMISSION DATE:

26 April 2024

PREPARED FOR

ESKOM HOLDINGS SOC LIMITED

PREPARED BY

NSOVO ENVIRONMENTAL CONSULTING

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DOCUMENT CONTROL

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DECLARATION OF INDEPENDENCE

- I Tshiamo Setsipane, in my capacity as a specialist consultant, hereby declare that I:
- Act/acted as an independent specialist to Eskom Holdings for this project.
- Do not have any personal, business, or financial interest in the project except for financial remuneration for specialist investigations completed in a professional capacity as specified by the Environmental Impact Assessment Regulations, 2014, as amended.
- Will not be affected by the outcome of the environmental process, of which this report forms part.
- Do not have any influence over the decisions made by the governing authorities.
- Do not object to or endorse the proposed developments but aim to present facts and my best scientific and professional opinion about the impacts of the development.
- Undertake to disclose to the relevant authorities any information that has or may have the potential to influence its decision or the objectivity of any report, plan, or document required in terms of the Environmental Impact Assessment Regulations, 2014, as amended.

(*Pr. Nat. Sci* 114882)

DOCUMENT GUIDE

This report was compiled according to the following information guidelines for a specialist report in terms of the Environmental Impact Assessment (EIA) Sections 24(5)(a) And (h) and 44 of the National Environmental Management (NEMA), Act 1998, as summarised on the Table below.

Table A: Document guide according to Regulation (No. R. 982) as amended.

Theme-Specific Requirements as per Government Notice No. 320Agricultural Resources Theme – Very High and High Sensitivity Rating as per Screening Tool Output

No.	NEMA Regs (2014) - Appendix 6	Relevant section in the report
2	**Agricultural Agro-Ecosystem Specialist Assessment**	
2.1	The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professionals (SACNASP).	CV Attached
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	Section 1.1
2.3	**The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:**	
2.3.1	the extent of the impact of the proposed development on the agricultural resources and	Section 4
2.3.2	whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site, and in the event it does, whether the positive impact of the proposed development on agricultural resources outweighs such a negative impact.	Section 4
2.4	**The status quo of the site must be described, including the following aspects, which must be considered as a minimum in the baseline description of the agro-ecosystem:**	
2.4.1	the soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit, and slope;	Section 3.2
2.4.2	where applicable, the vegetation composition, available water sources, as agro-climatic information;	
2.4.3	the current productivity of the land-based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units;	Section 6
2.4.4	the current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure and	N/A
2.4.5	existing impacts on the site, located on a map (e.g., erosion, alien vegetation, non-agricultural infrastructure, waste, etc.).	Figures 20-23

2.5	**Assessment of impacts, including the following aspects which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:**	
2.5.1	change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units;	Section 6
2.5.2	change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure and	N/A
2.5.3	any alternative development footprints within the preferred site would be of "medium" or "low" sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification.	Section 4
2.6	**The Agricultural Agro-Ecosystem Specialist Assessment findings must be written up in an Agricultural Agro-Ecosystem Specialist Report.**	
2.7	**This report must contain the findings of the agro-ecosystem specialist assessment and the following information, as a minimum:**	
2.7.1	Details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment, including a curriculum vitae;	Munyadzi CV
2.7.2	A signed statement of independence by the specialist;	Munyadzi
2.7.3	The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 2.2
2.7.4	A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant;	Section 2
2.7.5	A map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;	Figures 12 - 14
2.7.6	An indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development;	Section 6
2.7.7	An indication of possible long-term benefits that will be generated by the project in relation to the benefits of the agricultural activities on the affected land;	Section 5
2.7.8	Additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc.;	Section 4.2
2.7.9	Information on the current agricultural activities being undertaken on adjacent land parcels;	Section 3.2
2.7.10	An identification of any areas to be avoided, including any buffers;	N/A
2.7.11	A motivation must be provided if there were development footprints identified as per paragraph 2.5.3 above that were identified as having a	Section 5

	"medium" or "low" agriculture sensitivity and that were not considered appropriate;	
2.7.12	Confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities;	Section 5
2.7 .13	A substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development;	Section 5
2.7.14	Any conditions to which this statement is subjected;	Section 5
2.7.15	Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr); and	Section 5
2.7.16	A description of the assumptions and any uncertainties or gaps in knowledge or data.	Section 1.6
2.8	**The Agricultural Agro-Ecosystem Specialist Assessment findings must be incorporated into the Basic Assessment Report or Environmental Impact Assessment Report, including the mitigation and monitoring measures identified, which are to be contained in the EMPr.**	
2.9	**A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.**	

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1. INTRODUCTION

Nsovo Environmental Consulting was appointed by Eskom to undertake soil, land use and land capability assessment as part of the Environmental Impact Assessment (EIA) process for the proposed 88KV SAR Rooikop powerline deviation in Ward 40 of Ekurhuleni Metropolitan Municipality in Gauteng Province, South Africa. The proposed powerline was afforded a 50 m zone of influence (i.e., 50 m on either side of the proposed development) to account for edge effects and will be referred to as the "study area". Figure 1 below depicts the locality of the study area in relation to the surrounding areas.

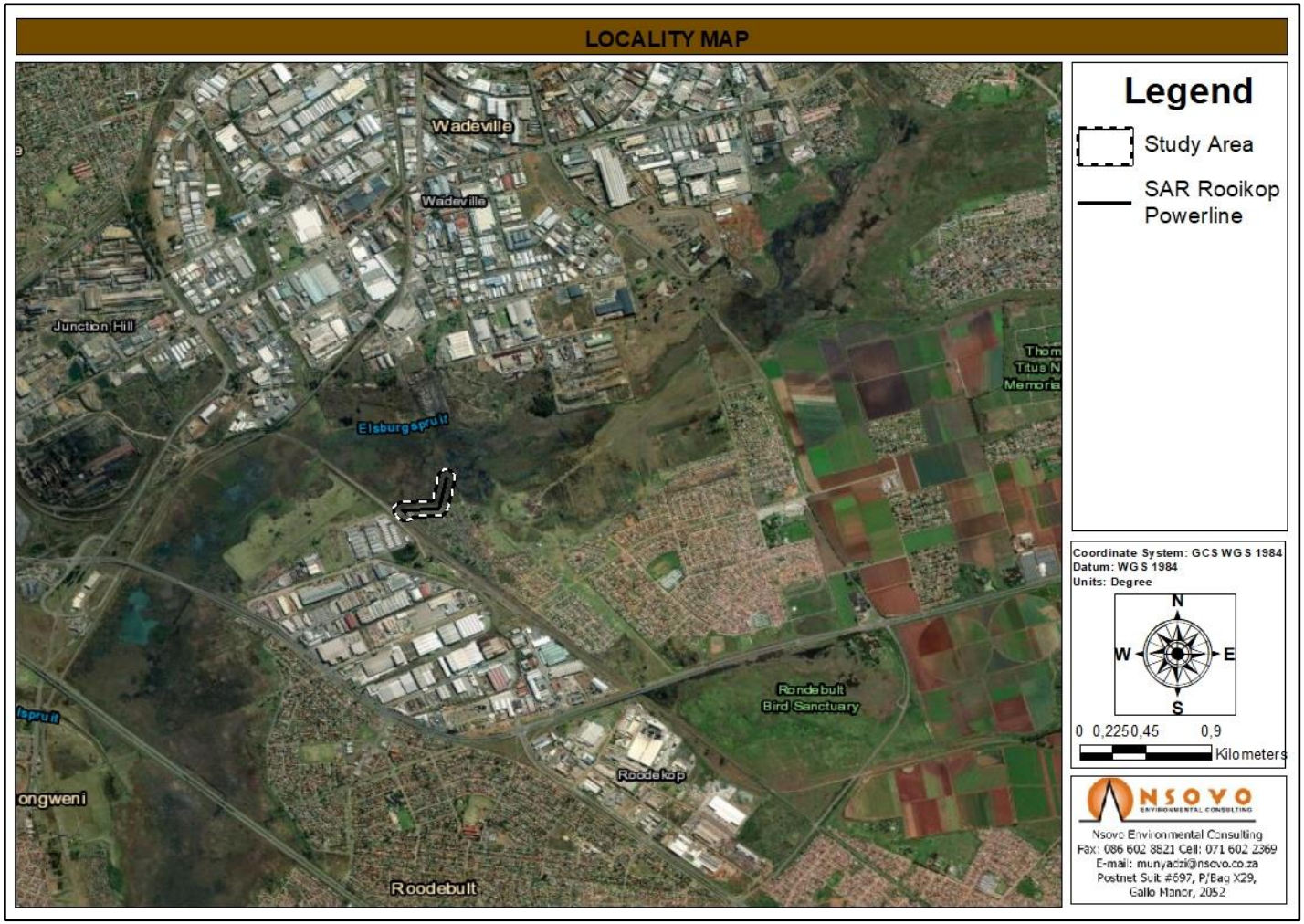

Figure 1: Locality of the study area in relation to the surrounding areas.

1.1 PROJECT DESCRIPTION

The Detailed Scope of Work includes:
The proposed deviation is approximately 485.05 meters for the 88KV powerline, and it will involve the following:

- Servitude acquisition along the perimeter of the wetland, from structure 3 to SAR Rooikop substation.
- Dismantle conductors and structures, from structure 1 to structure 3.
- Scrap the dismantled material on site.
- Install 2 x 20 m Steel Monopole structures, along the new servitude.
- Install 14 stays.
- String Panther conductors from structure 3 to SAR Rooikop substation.

1.2 AIMS AND OBJECTIVES OF THE STUDY

The objective of the Soil, Land Use, and Land Capability is to fulfil and align the proposed project with the requirements of the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) of South Africa. This act aims to promote the conservation of soil, water sources, vegetation, and the control of weeds and invader plants by managing natural agricultural resources. Thus, the proposed study aims to determine the possible impacts that the proposed development could have on the soils, land use, land capability, and agricultural potential and to identify areas of high sensitivity within the study area. This will be achieved by considering parameters such as soil quality, drainage, topography, climate, and water availability and providing sound input to ensure that land is used sustainably and responsibly. As such this specialist report has assessed and considered the following:

- The soil forms occurring within the study area;
- The associated land capability and agricultural sensitivity of the soils occurring within the study area;
- Discussion of the land capability and sensitivity in terms of the soils, water availability, surrounding development, and current status of land;
- Discussion of potential and actual impacts because of the proposed development; and
- Provide mitigation for the impacts as part of the Environmental Management Programme (EMPr).

1.3 SUITABILITY OF SOILS FOR AGRICULTURAL CULTIVATION

Assessing soil suitability for agricultural cultivation rests primarily on identifying soils suited to crop production. For soils to be classified as being suitable for crop cultivation, they must have the following properties:

- Adequate depth (greater than 60 cm) to accommodate root development for the majority of cultivated crops;
- Good structure, as in water-stable aggregates, which allows for root penetration and water retention;
- Sufficient clay and organic matter to provide nutrients for growing crops;
- Sufficient distribution of high quality and potential soils within the study area to constitute a viable economic management unit;
- Adequate clay content and deep enough water table to allow for water storage; and
- Good climatic conditions, such as sufficient rainfall and sunlight, increase crop choice variety.

1.4 APPLICABLE LEGISLATION

The most recent South African Environmental Legislation that needs to be considered for any new or expanding development with reference to assessment and management of soil and land use includes:

- The National Environmental Management Act. 1998 (Act 107 of 1998), requires that pollution and degradation of the environment be avoided, or, where it cannot be avoided, be minimised and remedied.
- The Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal.
- The Conservation of Agriculture Resources (Act 43 of 1983) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils employing suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges, and watercourses is also addressed.

1.5 TERMS OF REFERENCE

The terms of reference applicable to the Soils, Land Capability, and Land Use Study include the following:

- A review of available desktop information about the study area site and compile various maps illustrating the desktop data;
- Discussion of the relevant desktop literature;
- Conduct a soil classification survey covering the study area according to the South African Soil Classification System: A Natural and Anthropogenic System for South Africa (Soil Classification Working Group, 2018);

- Determination of the current (baseline) soil physical, climatic conditions, and land uses, as well as the current land capabilities and agricultural sensitivity associated with the identified soil forms present in the study area;
- Identification and assessment of the potential impacts of the different project phases on the baseline soil, land use, and land capability properties because of the proposed development
- Development of mitigation and management measures to minimize the negative impacts anticipated from the proposed development and
- Compile soil, land use, and land capability reports based on the field-finding data under current on-site conditions.

1.6 ASSUMPTIONS, ASSUMPTIONS UNCERTAINTIES, LIMITATIONS, AND GAPS

The following assumptions, uncertainties, limitations, and gaps were applicable for the soil, land use, and land capability assessment:

- It is assumed that the infrastructure components will remain as indicated on the layout and that the activities for the construction and operation of the infrastructure are limited to that typical for a project of this nature;
- The soil survey was confined to the study area outline with consideration of various land uses outside the study area;
- Certain farm portions could not be accessed due to owners decline to grant access and locked gates and fear of trespassing; and
- Soil profiles were observed using a 1.5m hand-held soil auger; thus, a description of the soil characteristics deeper than 1.5m cannot be given.

2. METHODOLOGY

The assessment of the Study Area's agricultural potential was based on a combination of desktop studies to amass general information and site visits for status quo assessment, soil classification, and characterization, and the validation of generated information from the desktop studies.

2.1 DESKTOP STUDY AND LITERATURE REVIEW

Literature review and background study were carried out before beginning the field assessment to gather the study area's predetermined soil, land use, and land capability data. The data was sourced from the Soil and Terrain (SOTER) database and the Natural Agricultural Atlas of South Africa Version 3: (https://ndagis.nda.agric.za/portal/apps/webappviewer/index.html?id=8b72eb2a25c04660a1ab2b562f6ec0bf)

2.2 SITE SURVEY

A desktop assessment was followed by a field investigation to validate the predetermined soil results obtained at the desktop level. The field survey was conducted over 1 day in April 2024, wherein soil auger tests were conducted, and soils were classified into soil forms according to the Soil Classification System: A Natural and Anthropogenic System for South Africa Soil Classification System (2018). It must be noted that the season has no bearing on the soil's morphological properties over a short-term period.

2.3 LAND CAPABILITY CLASSIFICATION

A land capability class is an interpretive grouping of land units with similar potential and containing limitations or hazards for long-term intensive use of land for rainfed farming determined by the interaction of climate, soil, and terrain. It is a more general term than land suitability and is more conservation oriented (See Table 1 below). It involves consideration of:

- Varying limitations to land use pertaining to rainfed cultivation and soil properties; and
- The risks of land damage from erosion and other causes.

Eight land capability classes were employed with potential decreases and limitations and hazards increasing from class 1 to class 8. Classes 1 to 4 are considered arable, whereas Class 5 is considered wet based soils or watercourses and Classes 6 to 8 are classified as grazing, forestry, or wildlife. This system is based on the Land Capability Classification system of the United States Department of Agriculture (USDA) Soil Conservation Service by Klingelbiel and Montgomery (1961) as well as by Scotney *et.al* (1987).

Table 1: Soil Capability Classification (after Scontey *et al*., 1987).

Land Capability Group	Land Capability Class	Intensity of Land Use									Limitations
		wildlife	Forestry	Light grazing	Moderate grazing	Intensive grazing	Light cultivation	Moderate cultivation	Intensive cultivation	Very intensive cultivation	
Arable	I										There are no or few limitations. Very high arable potential. Very low erosion hazard
	II										Slight limitations. High arable potential. Low erosion hazard
	III										Moderate limitations. Some erosion hazards
	IV										Severe limitations. Low arable potential. High erosion hazard.
Grazing	V										Water course and land with wetness limitations
	VI										Limitations preclude cultivation. Suitable for perennial vegetation
	VII										Very severe limitations. Suitable only for natural vegetation
Wildlife	VIII										Extremely severe limitations. Not suitable for grazing or afforestation.

The updated and refined land capability ratings and database for the whole of South Africa was released by the Department of Fishery and Forestry (DAFF) in 2016 and now the Department of Agriculture, Land Reform and Rural Development (DALRRD). These land capability ratings were derived through a spatial evaluation modelling approach and a raster spatial data layer comprising fifteen (15) land capability evaluation values 9 (see Table 3 below). The new land capability describes the categories as 1 being the lowest and 15 being the highest. Values of below 8 are generally not suitable to produce cultivated crops. (DAFF, 2016). Soil agricultural potential is impacted by several factors (see Table 2 below). The soil agricultural potential was evaluated based on the factors mentioned and described in Table 3 by assigning qualitative criteria ratings such as High, Moderate, or Marginal to low to the updated land capability ratings.

Table 2: National Land Capability Values (DAFF, 2016).

Land Capability evaluation value	Land Capability Description
1	Very Low
2	
3	Very Low to Low
4	
5	Low
6	Low to Moderate
7	
8	Moderate
9	Moderate to High
10	
11	High
12	High to Very High
13	
14	Very High
15	

Table 3: Soil Agricultural Potential Criteria

Criteria	Description
Rock Complex	If a soil type has prevalent rocks in the upper sections of the soil, it is a limitingfactor to the soil's agricultural potential
Flooding Risk	The risk of flooding is determined by the closeness of the soil to water sources.
Erosion Risk	The soil erosion risk is determined by combining the wind and watererosion potentials.
Slope	The slope of the site could potentially limit the agricultural use thereof.
Texture	The texture of the soil can limit its use by being too sandy or too clayey.
Depth	The effective depth of soil is critical for the rooting zone for crops.
Drainage	The capability of soil to drain water is important as most grain crops do nottolerate submergence in water.
Mechanical Limitations	Mechanical limitations are any factors that could prevent the soil from beingtilled or ploughed.
pH	The pH of the soil is important when considering soil nutrients and fertility.
Soil Capability	This section highlights the soil type's capability to sustain agriculture.
Climate Class	The climate class highlights the prevalent climatic conditions that couldinfluence the agricultural use of a site.
Land Capability / Agricultural Potential	The land capability or agricultural potential rating for a site combines the soil capability and the climate class to arrive at the potential of the site to support agriculture.

2.4 DFFE Screening Tool

The Agricultural Agro-Ecosystem Assessment protocol provides the criteria for assessing and reporting impacts on agricultural resources for activities requiring Environmental Authorisation (EA). The assessment requirements of this protocol are associated with a level of environmental sensitivity determined by the national web-based environmental screening tool, which, for agricultural resources, is based on the most recent land capability evaluation values provided by the Department of Forestry, Fisheries, and the Environment (DFFE). The national web-based environmental screening tool can be accessed at: https://screening.environment.gov.za/screeningtool.

The primary purpose of the Agricultural Agro-Ecosystem Assessment is to determine the site's sensitivity considering the proposed land use change (from potential agricultural land to the proposed development is sufficiently considered). The information in this report aims to enable the Competent Authority (CA) to make sound conclusion and recommended on the proposed project and its potential impacts with specific focus on food security.

To meet this objective, the protocol requires that site sensitivity verification be conducted, and subsequent outcomes must meet the following objectives:

- It must confirm or dispute the current land use and the environmental sensitivity as indicated by the National Environmental Screening Tool;
- It must contain proof (e.g., photographs) of the current land use and environmental sensitivity pertaining to the study area;
- All data and conclusions are submitted together with the main report for the proposed development;
- It must indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site, and if it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources and
- The report is prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

Thus, the report is compiled to meet the minimum report content requirements for impacts on agricultural resources by the proposed development.

2.5 DFFE SCREENING TOOL

The Screening tool for the study area associated with the proposed powerline is presented in Figure 2 below.

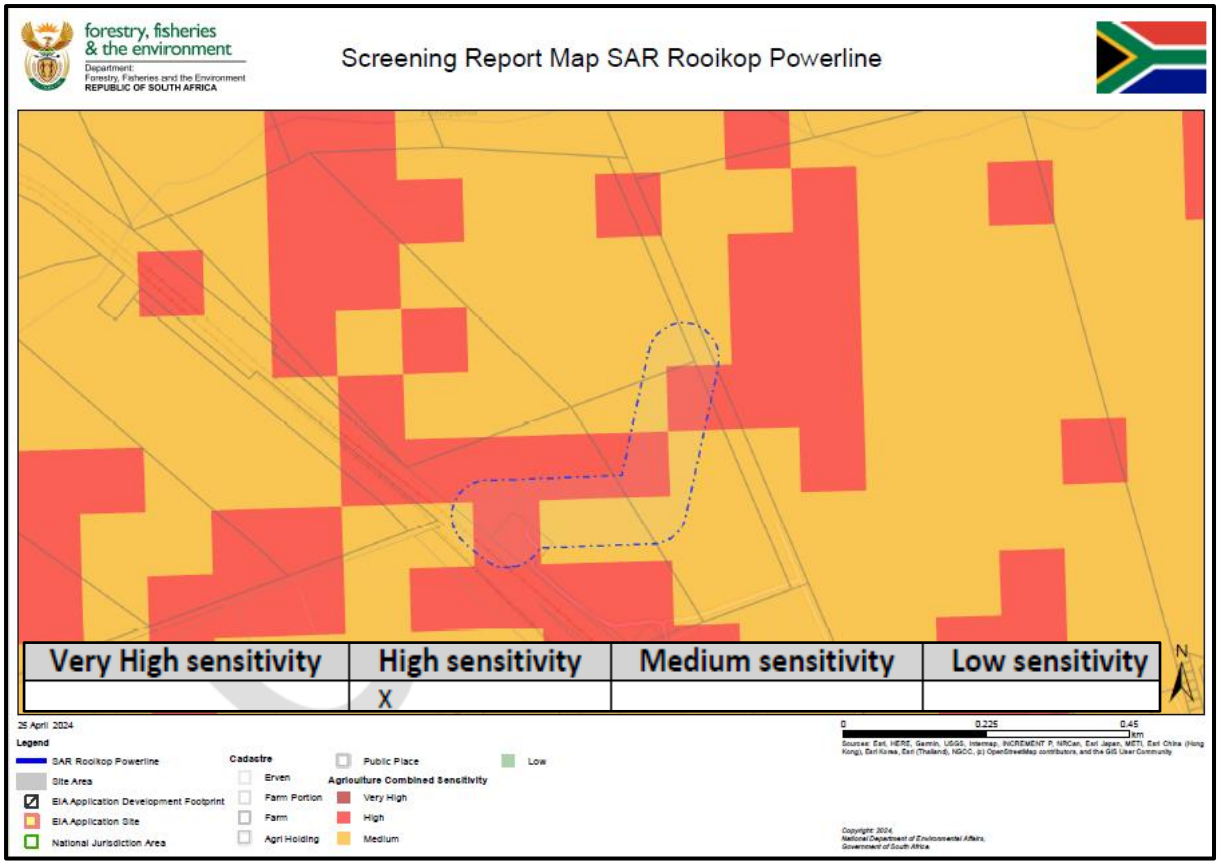

Figure 2: Screening tool sensitivity for the preferred alternative.

3. DESKTOP RESULTS AND DISCUSSIONS

3.1 CLIMATIC DATA

The study area falls within the subtropical highland climate characterised by hot and humid summers and cool to mild winters. Most summer rainfall occurs during thunderstorms that build up due to the intense surface heating and subtropical solid sun angle. The mean annual rainfall ranges between 601- and800 mm; this rainfall is deemed adequate to support rainfed agriculture and planting dates, and the length of the growing season may be slightly affected and needs to be carefully considered. Figure 3 depicts the mean annual rainfall associated with the study area.

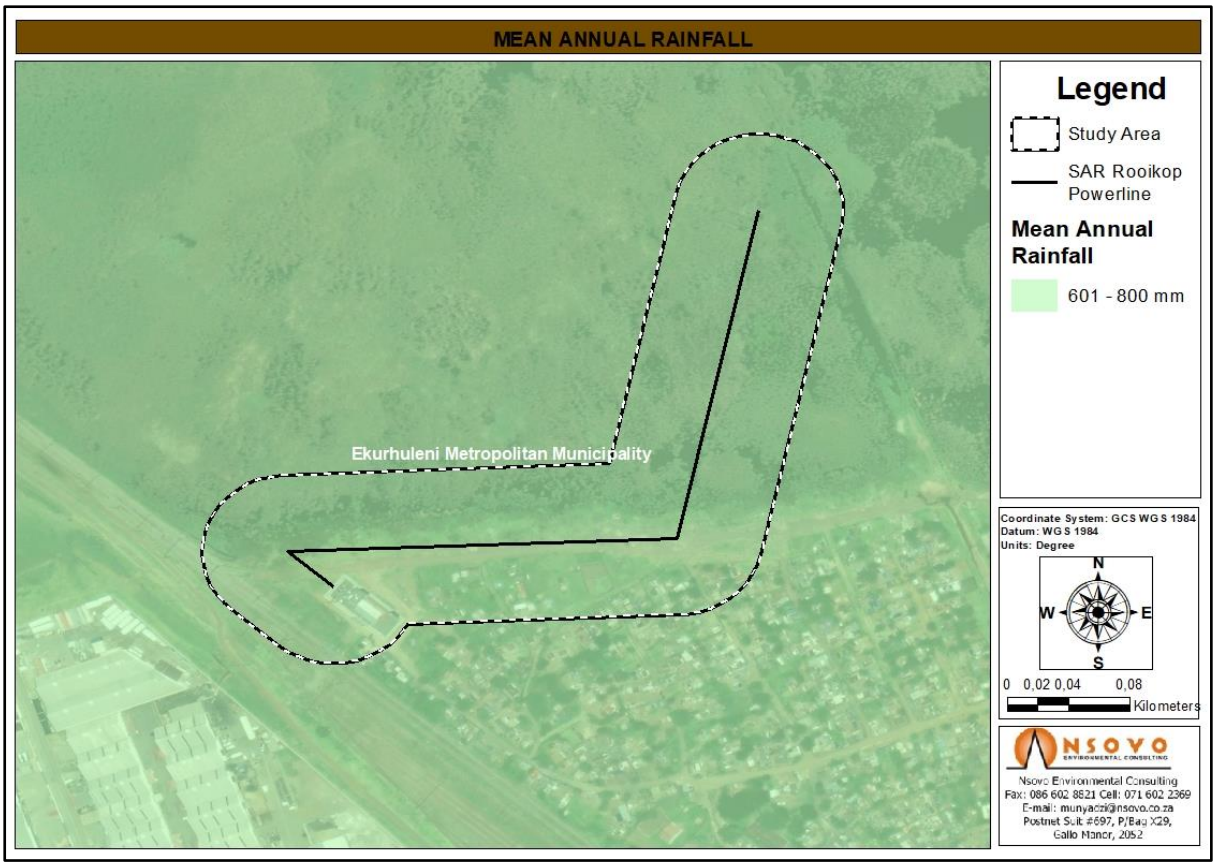

Figure 3: Mean Annual Rainfall associated with the study area.

3.2 GEOLOGY

The entire study area is underlain by the Witswatersrand basin associated with the Ventersdorp lava and Karoo dolerite. Figure 4 depicts the geological type associated with the study area.

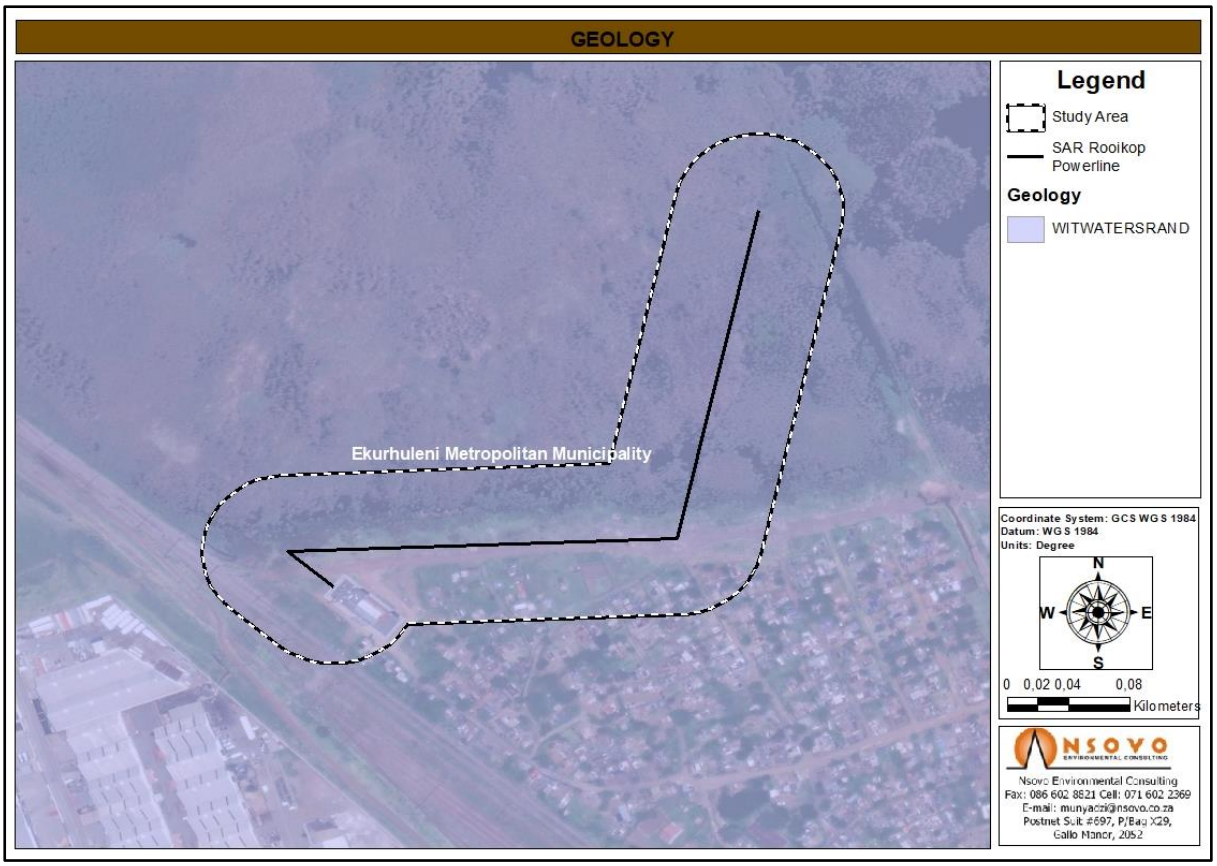

Figure 4: Geological formations associated with the study area.

3.3 SOIL PH

The soil pH associated with the soils occurring within the study area ranges between 5.5 and 6.4, which is considered slightly acidic. The low pH can be attributed to other factors, which include but are not limited to;

- Parent material;
- Loss of organic matter;
- Removal of soil minerals when crops are harvested;
- Erosion of the surface layer; and
- Effects of nitrogen and sulphur fertilizers.

Within this pH range some trace elements may become unavailable but however optimum for many sensitive plants. However, these soils can be neutralised by the addition of lime. Figure 5 below depicts the soil pH associated with soils within the study area.

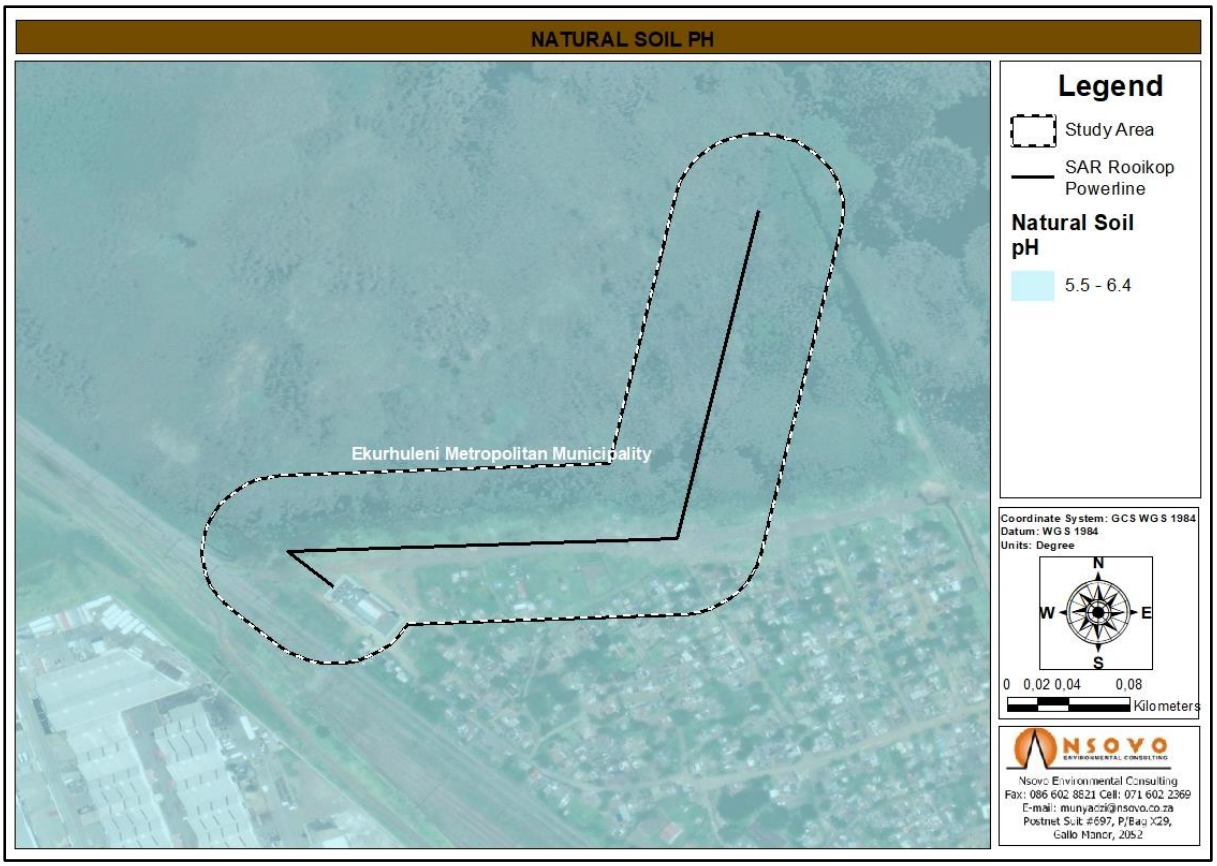

Figure 5: Soil pH associated with the project area.

3.5 Soil and Terrain (SOTER) Dominant Soils

The entire study area is characterised by Haplic Lixisols. These soils are typically highly weathered with the subsoil clay enriched compared to the sandier topsoil horizons because of clay illuviation, thus causing dense, firmly structured, and slowly permeable subsoil horizons. However, these soils can be cultivated due to the sandier topsoil and more fertile subsoil. However, a robust fertiliser programme will have to be adopted as these soils contains low levels of nutrients and nutrient reserves. Figure 6 below shows the SOTER soils associated with the study area.

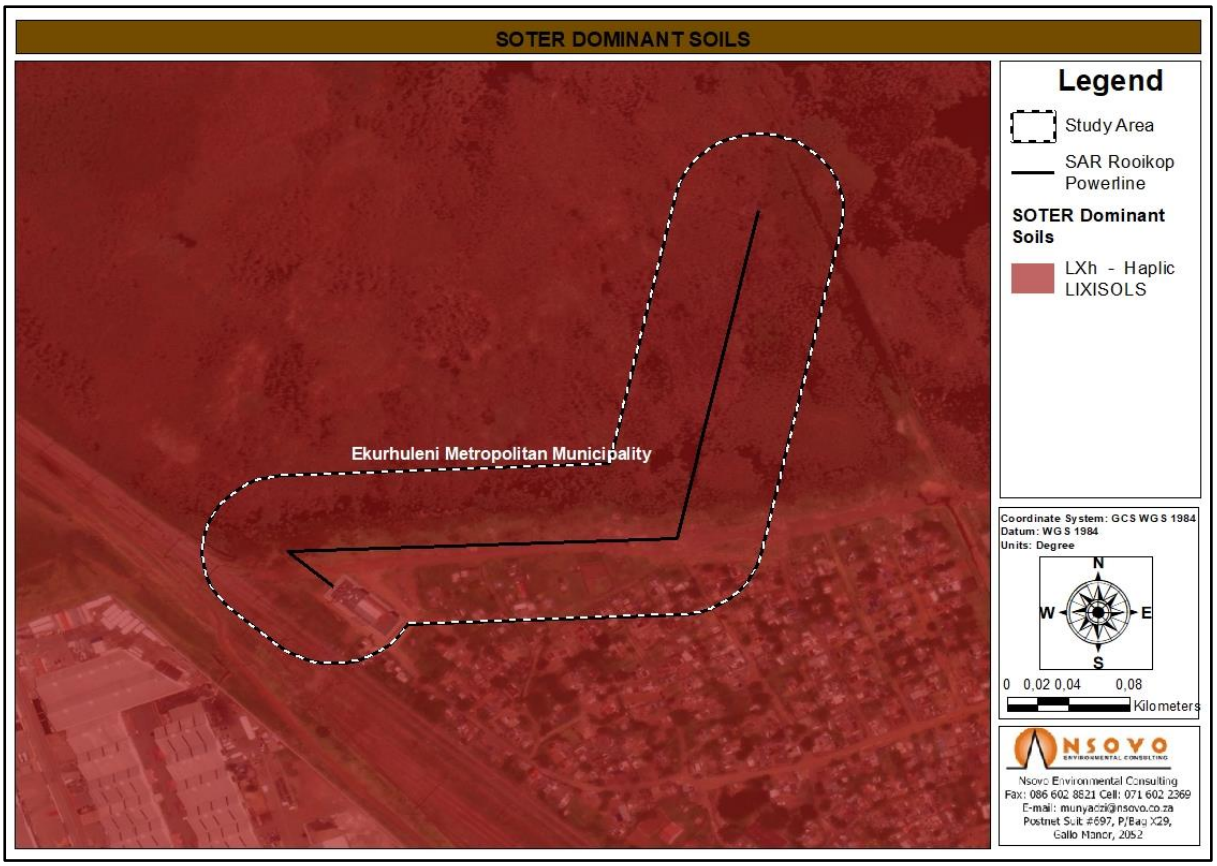

Figure 6: SOTER dominant soils associated with the study area.

3.6 LANDTYPE CLASSES

The Ab7 landtype characterises the entire study area. The A landtypes are characterised by red and yellow structureless soils without water tables within the observable soil profile. These soils develop in a tropical climate with a pronounced dry season on old landscapes. Their age and mineralogy have led to low levels of plant nutrients and a high erodibility, making agriculture possible only with frequent fertilizer applications, minimum tillage, and careful erosion control. Figure 7 depicts the landtype classes associated with the study area.

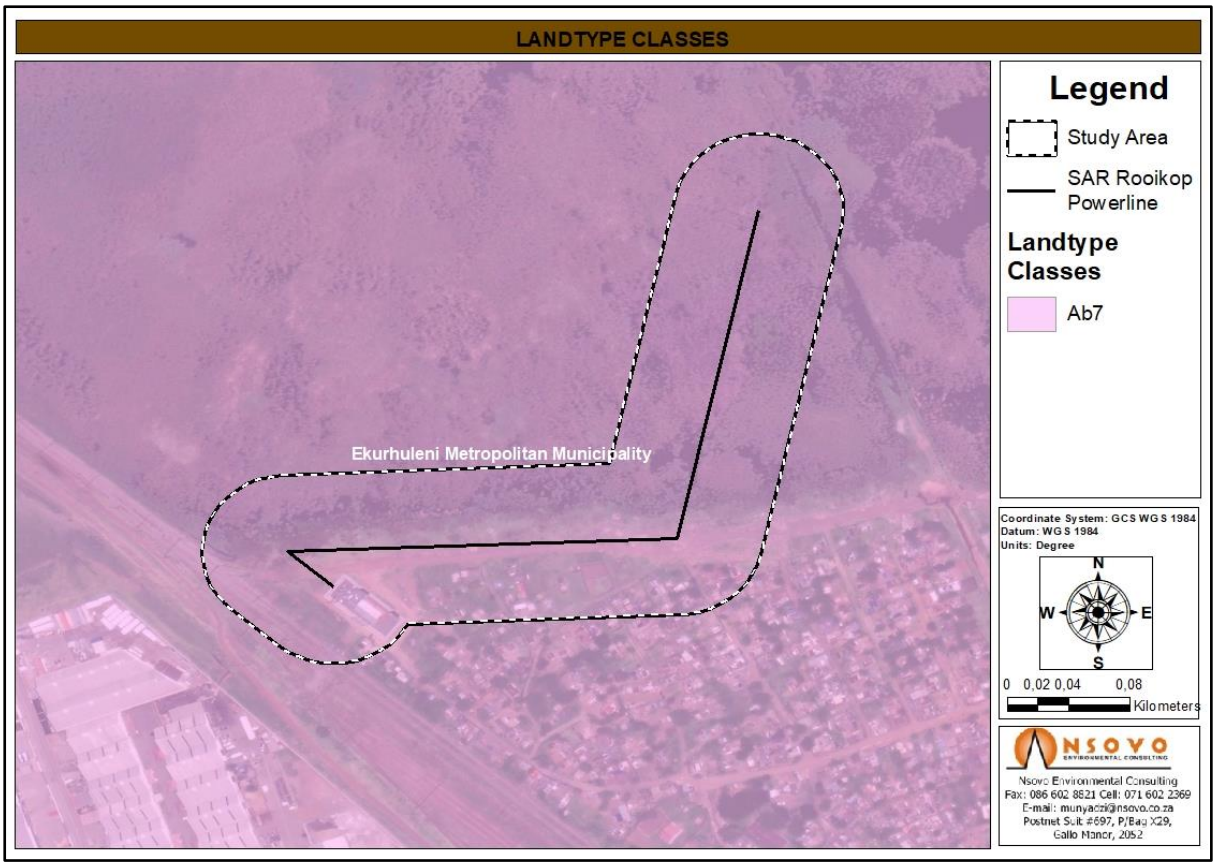

Figure 7: Landtype classes associated with the study area.

3.7 DESKTOP LAND CAPABILITY

The soils associated with the entire study area are high potential arable land (Class III). Figure 8 below shows the desktop land capability associated with the study area.

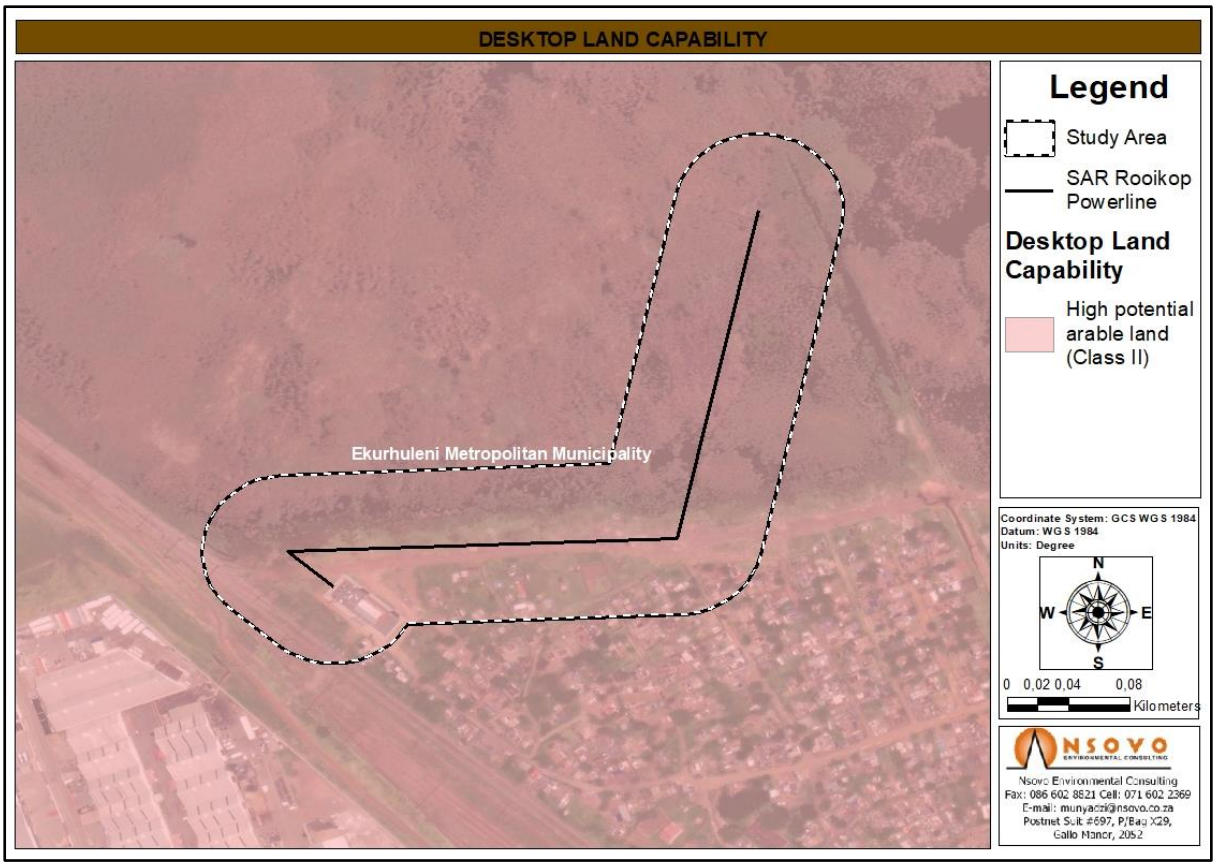

Figure 8: Desktop land capability associated with the study area.

4. FIELD VERIFIED RESULTS AND DISCUSSIONS

4.1 LAND USES WITHIN THE STUDY AREA

The land uses within and in the vicinity of the study area include industrial areas located south east of the study area. The informal settlement was observed in the immediate south of the study area with residents practicing subsistence cropping within the yards. Signs of soil degradation in the form of soil erosion and illegal dumping were observed. Figure 12 below shows the identified land uses within the study area.

Figure 9: Land uses associated with the study area.

4.2 Soil Forms in the Study Area

The section below focuses on the identified soil forms within the study area, which are described below. The spatial distribution of the identified soil forms within each study area is presented in Figure 15. The summary table depicting the area of coverage of each identified soil form is presented in Table 4.

1.2.1 Katspruit

The Katspruit soil forms (wetland soils) are generally limited to supporting plants tolerant to prolonged wet conditions (i.e., hydrophytes). These soils, as they are associated with wetlands, are of low agricultural potential due to various limiting factors such as high clay content and waterlogging conditions, thus creating anaerobic conditions that are not suitable for most cultivated crops. These soils are classified under the Wet-based soils (Class V) land capability class, and frequent waterlogging is their main limitation. Figure 15 below depicts soils associated with the watercourses.

Figure 10: View of the identified Katspruit soils associated with watercourses.

1.2.2 Witbank/Johannesburg

These soils are usually disturbed by anthropogenic influences such as intentional transportation and severe physical disturbance for urban development (waste dumps, industrial and residential in this case). Therefore, these soils are typically not suitable for large scale cultivation.

Figure 11: Anthropogenically disturbed soils of the Witbank/Johannesburg formation.

Table 4: Soil forms in hectares (ha) occurring within the study area.

Study Area					
Soil Forms	**Area (Ha)**	**Percentage (%)**	**Land Capability Class – According to (Smith, 2006)**	**Agricultural Potential**	**DAFF (2016) Classification**
Katspruit	3.2	58.4	Watercouse (Class V)	Low	5. Low
Witbank/Johannesburg	2.3	41.6	Wilderness (Class VIII)	Very Low	1. Very Low
Total Enclosed	**5.4**	**100**			

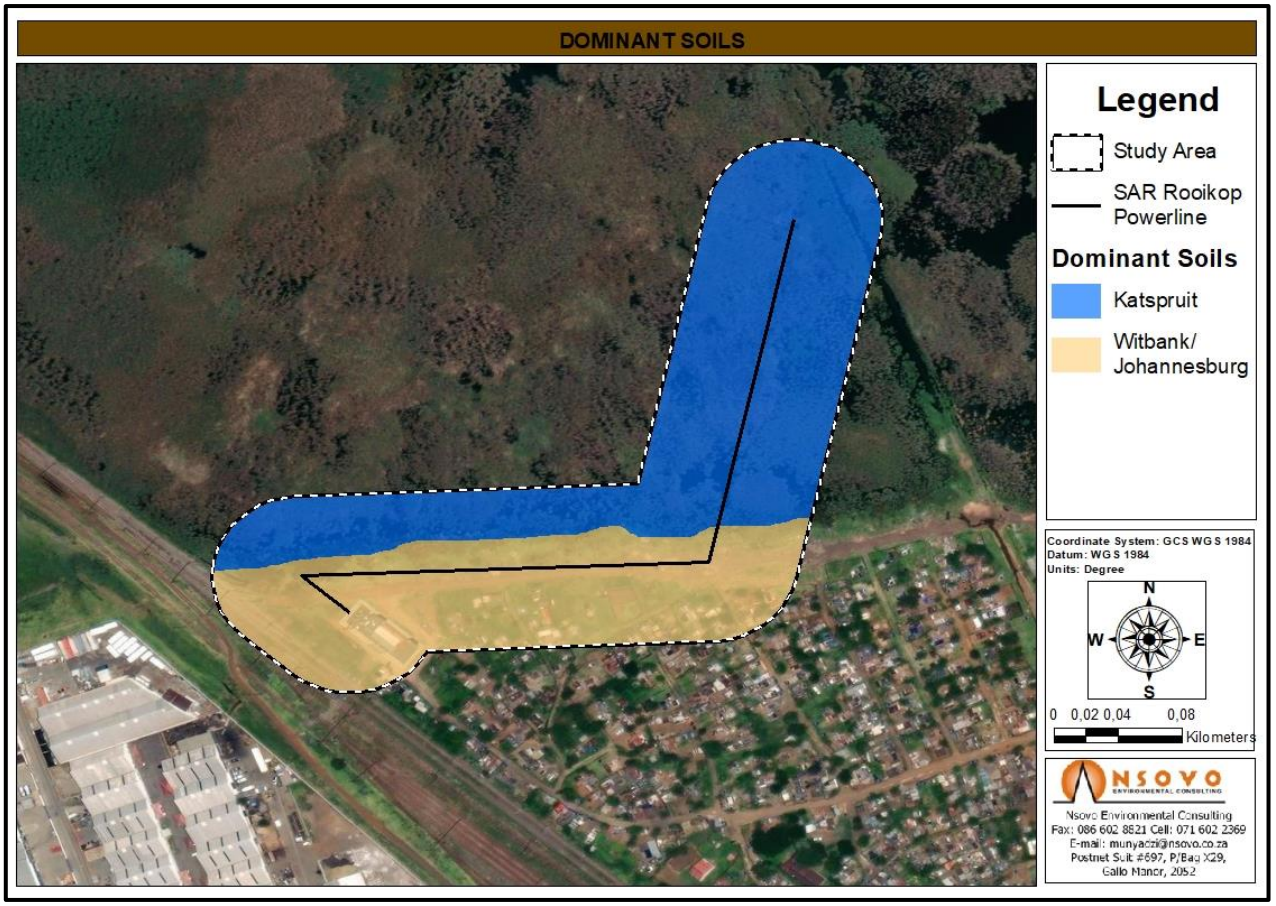

Figure 12: Dominant soils form within the preferred study area alternative.

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1.3 LAND CAPABILITY AND AGRICULTURAL SENSITIVITY

Land Capability is defined as the most intensive long-term use of land for purposes of rainfed farming, determined by the interaction of climate, soil, and terrain. The soil physical properties with which the agricultural potential for this assessment, agricultural sensitivity, was inferred in consideration of observed limitations to land use due to physical soil properties and prevailing climatic conditions. Figures 13 and 14 below depict the land capability and agricultural potential associated with the study area.

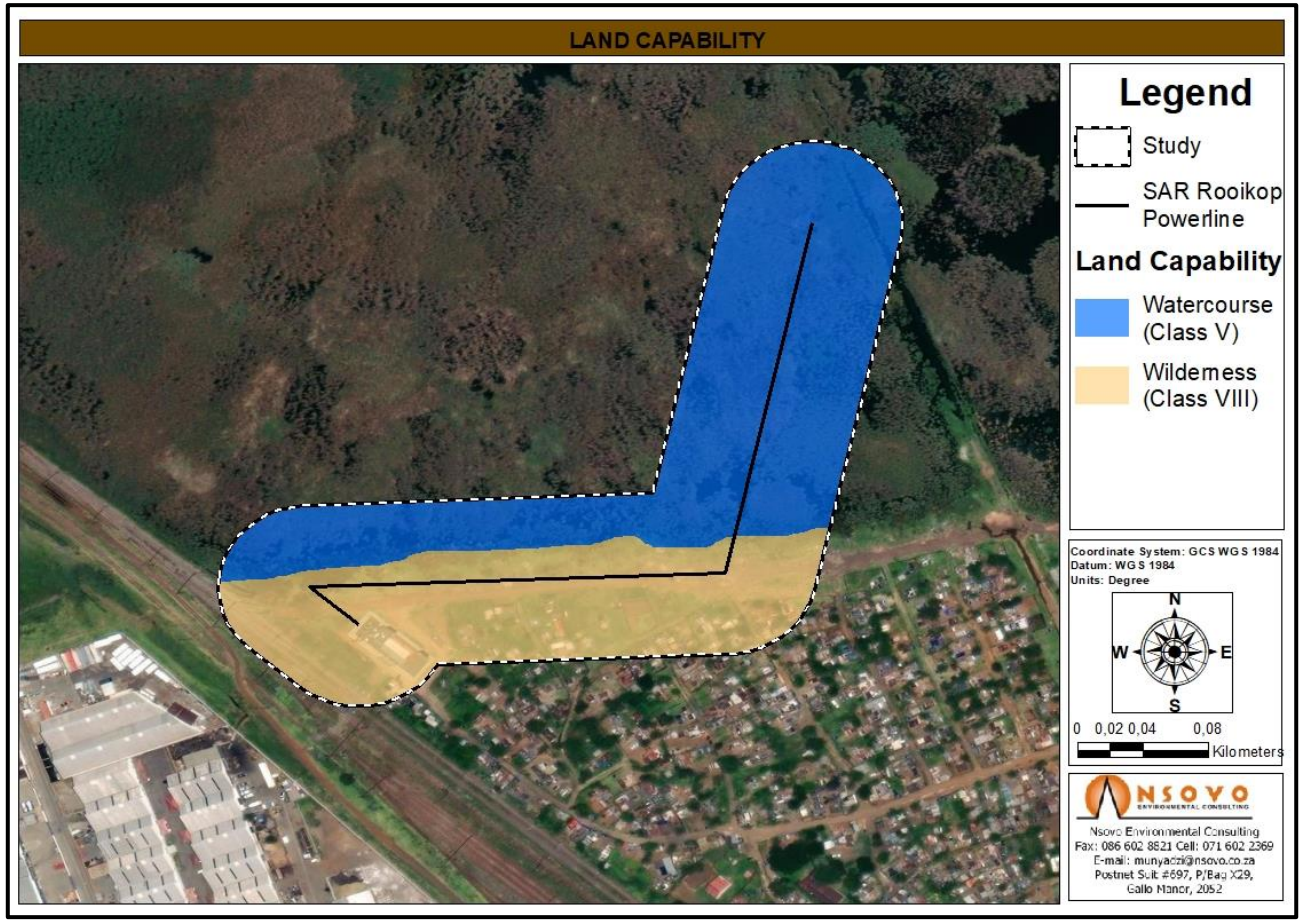

Figure 13: Map depicting land capability of soils within the preferred alternative study area.

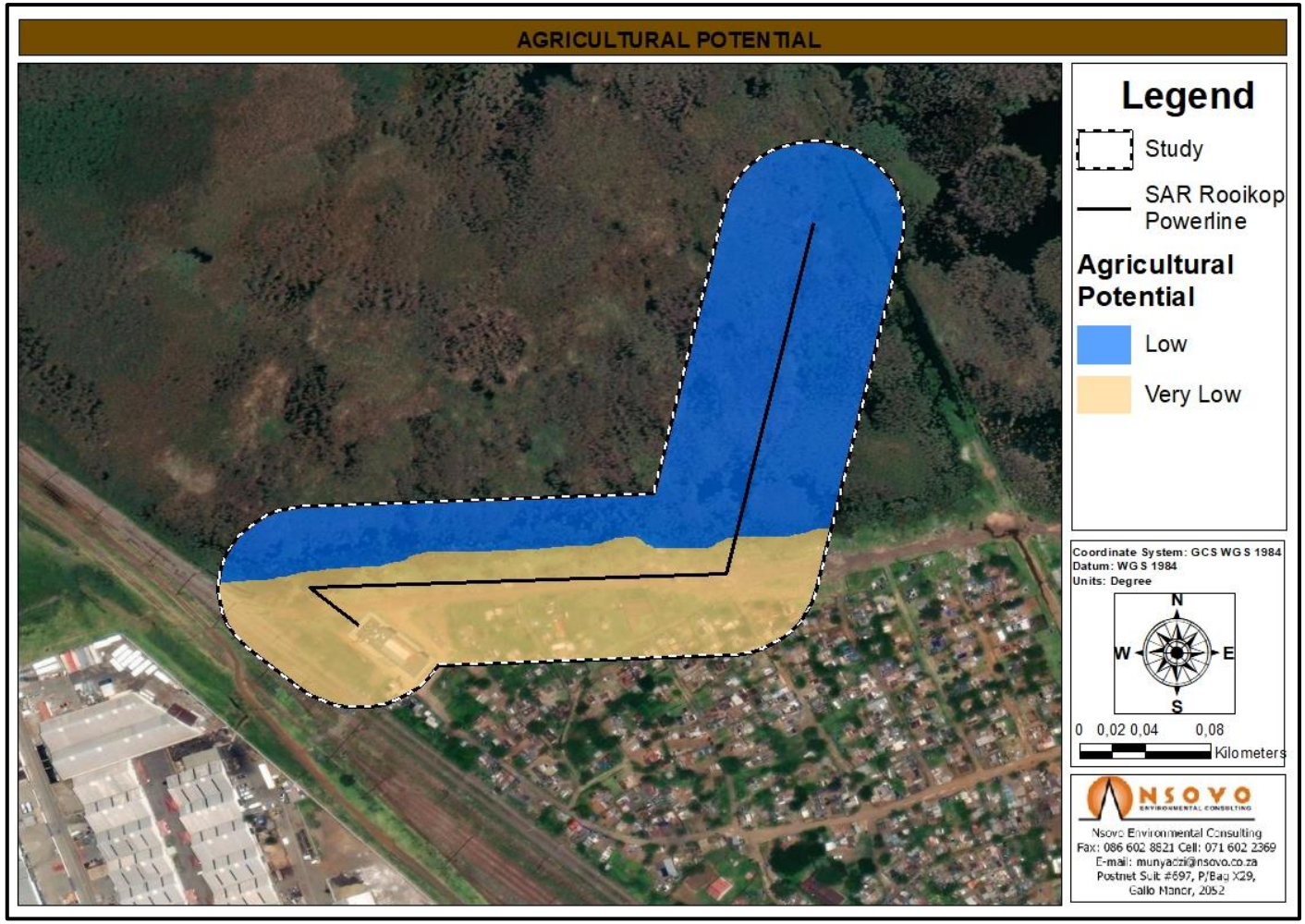

Figure 14: Agricultural potential for soils associated with the soils of the preferred alternative study area.

5. IMPACT STATEMENT AND SCREENING TOOL VERIFICATION

The study area is dominated by soils associated with freshwater systems, which cover 58.4% of the study area, followed by soils characterised by anthropogenic disturbance, which cover 41.6% of the study area. The soils of the Katspruit formation are inundated with water for long periods of time, and thus, this is considered a limitation for arable agriculture. The Witbank/Johannesburg soils are heavily disturbed due to human activities and as such, they are not considered for cultivation. In addition, the study area is in an industrial as well as informal settlement setting with existing impacts from prior construction activities, therefore the proposed powerline deviation activities are deemed acceptable from a soils and land capability point of view.

The screening tool analysis was conducted, which presented the findings as the impact on agricultural resources being of a very high sensitivity in terms of agricultural potential. Based on the outcomes of the field assessment, this was found to have a less significant impact as presented on the screening tool due to the dominant soil forms that are not high potential agricultural soils due to various limitations, including waterlogging conditions, shallower depth and requiring intensive management strategies to cultivate. The land capability of the surrounding soils, as well as the agricultural potential, are low to very low due inherent soil properties and anthropogenic impacts. The only possible impact of the development was identified as minimal soil and land degradation because of land disturbance during construction and decommissioning.

It is the opinion of the specialist that this study provides the relevant information required for the Environmental Impact Assessment phase of the project to ensure that appropriate consideration of the agricultural resources in the study area are made in support of the principles of Integrated Environmental Management (IEM) and sustainable development.

6. REFERENCES

Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983).

Council of GeoScience (CGS)., 2001.Geological survey (South Africa). Pretoria, South Africa.

Department of Agriculture, Forestry and Fisheries. Agricultural Geo-Referenced Information system (AGIS). Grazing Capacity Maps.

Department of Agriculture, Forestry and Fisheries.,1993. Agricultural Geo-referenced Information system (AGIS). Grazing Capacity Maps.

Gauteng Department of Agriculture and Rural Development, 2013.

Klingebiel, A. A., & Montgomery, P. H. (1961). Land-Capability Classification. Soil Conservation Service, U.S. Department of Agriculture, Agriculture Handbook No. 210.

Land Type Survey Staff, 1976-2006. Land type Survey Database. ARC-ISCW, Pretoria.

National Department of Agriculture, 2002. Development and Application of a Land Capability Classification System for South Africa

Scotney, D.M., Ellis, F., Nott, R.W., Taylor, K.P., Van Niekerk, B.J., Verster, E. & Wood, P.C., 1987. A system of soil and land capability classification for agriculture in the SA TBVC states. Dept. Agric., Pretoria.

Smith, B., 2006. The Farming Handbook. Netherlands & South Africa: University of KwaZulu Natal Press & CTA.

Soil Classification Working Group, 2018. Soil classification. A Natural and Anthropogenic System for South Africa. Mem. agric. nat. Resource. S. Afr. No. 15. Dept. Agric. Dev., Pretoria.

Zutari. (2022). MCWAP-2 River Management System Stage 3**:** Terms of Reference for the RMS Construction and Implementation (Statement of Work 1 – Weir Design): Zutari (Pty) Ltd.

Zutari. (2022). MCWAP-2 River Management Systems - Site Visit Report. Pretoria: Zutari (Pty) Ltd.

APPENDIX A: INDEMNITY

- This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken.
- This report is based on a desktop investigation using available information and data related to the site to be affected, *in situ* fieldwork, surveys, and assessments, and the specialist's best scientific and professional knowledge.
- The Precautionary Principle has been applied throughout this investigation.
- The findings, results, observations, conclusions, and recommendations given in this report are based on the specialist's best scientific and professional knowledge as well as information available at the time of the study.
- Additional information may become known or available later in the process for which no allowance could have been made at the time of this report.
- The specialist reserves the right to modify this report, recommendations, and conclusions at any stage should additional information become available.
- Information and recommendations in this report cannot be applied to any other area without proper investigation.
- This report, in its entirety or any portion thereof, may not be altered in any manner or form or for any purpose without the specific and written consent of the specialist as specified above.
- Acceptance of this report, in any physical or digital form, serves to confirm acknowledgment of these terms and liabilities.

Tshiamo Setsipane Pr. Sci. Nat. (114882)

16 April 2024

APPENDIX B: IMPACT ASSESSMENT METHODOLOGY

Status of Impact

The impacts are assessed as either having a:

The negative effect (i.e., at a `cost' to the environment),

positive effect (i.e., a `benefit' to the environment) or

Neutral effect on the environment.

Extent of the Impact

(**1**) Site (site only),

(**2**) Local (site boundary and immediate surrounds),

(**3**) Regional (within the project area),

(**4**) National, or

(**5**) International.

Duration of the Impact

The length that the impact will last is described as either:

(**1**) immediate (<1 year)

(**2**) short term (1-5 years),

(**3**) medium term (5-15 years),

(**4**) long-term (ceases after the operational life span of the project),

(**5**) Permanent.

Magnitude of the Impact

The intensity or severity of the impacts is indicated as either:

(**0**) none,

(**2**) Minor,

(**4**) Low,

(**6**) Moderate (environmental functions altered but continue),

(**8**) High (environmental functions temporarily cease), or

(**10**) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence

The likelihood of the impact actually occurring is indicated as either:

(**0**) None (the impact will not occur),

(**1**) improbable (probability very low due to design or experience)

(**2**) low probability (unlikely to occur),

(**3**) medium probability (distinct probability that the impact will occur),
(**4**) high probability (most likely to occur), or
(5) Definite.

Significance of the Impact

Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.

S=(E+D+M) P

The significance ratings are given below.

(**<30**) low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
(**30-60**) medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
(**>60**) high (i.e., where the impact must influence the decision process to develop in the area).

Assessment Of Impacts

The following section presents the impacts and the significance as rated by the specialists as well as the EAP. The Tables below highlight the significance of the identified impacts for both the construction and operational phases of the proposed development.

The impacts are assessed according to the criteria outlined below. Each issue is ranked according to extent, duration, magnitude (intensity), and probability. From these criteria, a significance rating is obtained, the method and formula is also described below. Mitigation measures and recommendations have been made and are presented in tabular form below.

The ratings are assessed with and without mitigation and color-coded as follows to indicate the significance:

High	**>60**
Medium	**>30 - 60**
Low	**<30**

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Construction Phase:							
Mitigation Measures							
Operational Phase							
Mitigation Measures							

APPENDIX C: CURRICULUM VITAE OF SPECIALIST

CURRICULUM VITAE OF TSHIAMO SETSIPANE

PROFESSIONAL EXPERIENCE

Soil Science Consultant

- Conducting Soil, Land Use and Land Capability Assessments:
  - Assess existing information for rainfall data and current land uses.
  - Conduct a desktop assessment within the study area using digital satellite imagery and other suitable digital aids.
  - A soil classification survey and agricultural potential will be conducted within the proposed development area.
  - A soil classification survey and agricultural potential will be conducted within the proposed development area.
  - Provide recommended mitigation measures to manage the anticipated impacts and comply with the applicable legislations.
  - Compile a report on the findings of the assessment and presented in an electronic format.
- Conducting Hydropedological Impact Surveys:
  - Identify dominant hillslopes (from crest to stream) of the project area using terrain analysis.
  - Conduct a transect soil survey on each of the identified hillslope.
  - Hydrological behaviour of the identified hillslope described according to the identified hydropedological groups;
  - Graphical representation of the dominant and sub-dominant flow paths at hillslope scale prior to development and post development.
  - The impact of the proposed development on the hydropedological behaviour described in a report format.
  - Quantification of hydropedological fluxes using the Soil and Water Analysis Tool (SWAT+) to determine the losses to the wetland systems though the proposed project
- Conducting Land Contamination Assessments and Soil Monitoring Assessments:
  - Assessments of historic and current storage of hazardous waste and materials on soils.
  - Topsoil stockpile quality assessment for future usage.
  - Monitoring programme to determine the dust suppression impact on soil chemical parameters.

EDUCATION

- M.Sc. (Agric): Soil Science **01/2016– 03/2019**
  - Dissertation: Characterisation of hydropedological processes and properties of a sandstone and a tillite hillslope, Kwa-Zulu Natal, South Africa.
  - Graduated *Cum-Laude*.
- B.Sc. (Agric) Honours: Soil Science **01/2014 – 11/2014**
  - Majored in soil fertility, soil physics, soil geography and soil chemistry.

- Research Project: Soil as an indicator of soil water regime.

- B.Sc. (Agric): Soil Science and Agrometeorology **2010 – 11/2013**
  - Majored in soil science and agrometeorology.
  - Minored in agronomy and plant pathology.

PROFESSIONAL MEMBERSHIP AND AFFILIATION

- Professional Natural Scientist with South African Council for Natural Scientific Professions (SACNASP) Registered, 11/2015 – Current
- Member of the Soil Science Society of South Africa (SSSSA)
- Member, South African Soil Surveyors Organization (SASSO)
- Member of the South African Wetland Society (SAWS)