SOIL, LAND USE AND LAND CAPABILITY ASSESSMENT: FOR THE MINING RIGHT APPLICATION ON PORTION 21, 55, 56, 64,65, 66, 69, AND 213 OF TENBOSCH 162 JU; PORTION 2, 5 AND 6 OF TURFBELT 593 JU AND REMAINING EXTENT OF TECKLENBURG`S RANCH 548 JU, SITUATED IN THE MAGISTERIAL DISTRICT OF BARBERTON IN MPUMALANGA PROVINCE.

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EXECUTIVE SUMMARY

The Enviro-Solum Consulting (ESC) was appointed by Singo Consulting Pty Ltd to conduct a soil, land use, land capability and agricultural potential verification assessment within the application area (hereafter referred to as the 'study area') in which the project proponent are applying for the right to prospect available coal resources and if appropriate, prepare an agricultural impact assessment as part of the Environmental Authorisation (EA) process for the proposed mining rights application. The study area is located along the N4 highway, approximately 6 km west of the town Komatipoort.

The objective of this study was to evaluate:

- Climatic conditions within the context of agricultural productivity and constraints;
- Landscape setting and land use,
- Soil physical characteristics with focus on suitability for cultivated agriculture;
- Land capability and potential of the soil resources associated with the project; and
- Other current limitations to various land use purposes.

The study area falls within the hot semi-arid climate zone characterised by hot summers and warm to cool winters, and minimal precipitation, with potential evapotranspiration exceeding precipitation on average. The mean annual rainfall is between 601 – 800 mm and this rainfall is deemed adequate to support rainfed agriculture. However, planting dates and length of growing season may be affected and need to be carefully considered.

Based on the observations during the site assessment, the dominant soils occurring within the study area are Cartref, Inhoek, Mayo/Glenrosa, Mayo/Milkwood, Shortlands/Stanger, Stanger/Darnall and Swarland/Valrivier. Majority of the soils occurring within the study area do not meet the conditions for agricultural suitability to a certain extent and these conditions are:

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

It is worth noting that some areas under the plantation of bananas, sugarcane and citrus which are more suited for the soils occurring in the study area are produced under irrigation. Even though, irrigated agriculture utilises large portions of South Africa's water resources, however it is responsible for the production of high value crops and fruits. Therefore, the Preservation and Development of Agricultural Land Framework Bill published on the 18th of September 2020, although not approved yet, stipulates that land under irrigation is automatically regarded as high potential. This is due to the high production capability and the possibility of exponentially increasing yields, and this is of high importance for food security at a local and reginal scale. In most cases there irrigated areas indicate high capital investments made onto the farm.

The study area is largely dominated by soils of lithic character (hard to cultivate) of the dominant soils, which are of low agricultural potential and account for 64% of the study area. These areas are not under cultivation and thus left for grazing and wilderness uses. The soils of duplex character (high in clay and strongly structured) account for 32% of the study area and are characterised to be of moderate potential and these areas are mostly cultivated under irrigation. Lastly the soils associated with the watercourses and wetland features account for 4% of the study area and are characterised to be of very low agricultural potential. Therefore, majority of the study area is not considered ideal for cultivation of crops and thus limited to plantations, grazing and wildlife uses. This is also coupled by the by hot summers and warm to cool winters, and minimal precipitation, with potential evapotranspiration exceeding precipitation on average which limits the choice of crop in the absence of irrigation options.

Some of the areas currently utilised for plantations and grazing may potentially be impacted, which will ultimately impact on the local and regional livestock and fruit production to a degree. Therefore, areas under plantations should afforded protection in line with the mitigation hierarchy to minimise impact on soil resources and achieve sustainable development. Overall, the soil assessment was done at a high level due the low quantum of risk presented by the proposed development and therefore should not be used for any other purpose then it is intended for. Should the quantum of risk of the project change for any reason, then a detailed soil investigation, delineation and classification may have to be undertaken in fulfilment of the applicable legislation.

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 sensitivity. Based on the outcomes of the field assessment this was found to be of a lower significance impact than that presented on the screening tool due to the inherent soil characteristics and climatic constraints for commercialised agricultural production. This can be attributed to the shallow soils and strongly structured, high clay soils identified on site which may require intensified management strategies to be cultivated on. Therefore, the overall impact is anticipated to be moderate and within acceptable levels from a soil and land capability point of view.

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 will be made in support of the principles of Integrated Environmental Management (IEM) and sustainable development.

DECLARATION OF INDEPENDENCE

I, Tshiamo Setsipane, in my capacity as a specialist consultant, hereby declare that I:

- Act/acted as an independent specialist to Singo Consulting Pty Ltd 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.

DOCUMENT GUIDE

This report was compiled according to the following information guidelines for a specialist report in terms of the Environmental Impact Assessment (EIA) Regulation 982 of the National Environmental Management Act (NEMA), as summarised on the Table below.

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

NEMA Regs (2014) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Appendix B
The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
A declaration that the person is independent in a form as may be specified by the competent authority	Page v
An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 2.2. The season has no relevance.
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 3.2 and 3.3
An identification of any areas to be avoided, including buffers	No buffers or areas to be avoided have been identified
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4 and 5. Impact Assessment as per project phase.
Any mitigation measures for inclusion in the EMPr	N/A
Any conditions for inclusion in the environmental authorisation	N/A.
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	N/A
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Section 4.2
Indemnity of use	Appendix A

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1. INTRODUCTION

The Enviro-Solum Consulting (ESC) was appointed by Singo Consulting Pty Ltd to conduct a soil, land use, land capability and agricultural potential verification assessment within the application area (hereafter referred to as the 'study area') in which the project proponent are applying for the right to prospect available coal resources and if appropriate, prepare an agricultural impact assessment as part of the Environmental Authorisation (EA) process for the proposed mining rights application.

The study area is located along the N4 highway, approximately 6 km west of the town Komatipoort. Figure 1 below depicts the locality of the study area in relation to the surrounding areas. Figure 2 below depicts the associated farm portions and boundaries.

The proposed non-invasive prospecting activities will include the following main techniques:

- Data search, field mapping and desktop studies;
- Logging and sampling historical core; and
- Scoping and (pre) feasibility studies.

For the purpose of this Basic Assessment (BA) process, the Environmental Assessment Practitioner (EAP) and appointed specialist will perform a baseline and/or desktop assessment identifying potential sensitivities in the general area of the properties.

Should additional sampling be required using any invasive prospecting methods, the areas where these activities will take place will require the necessary assessments as per the various protocols published for identified themes and approval from the Department of Minerals, Resources and Energy (DMRE), prior to commencement of any such activities.

1.1 Aims and Objectives of the Study

The objective of the Soil, Land Use and Land Capability is to fulfill the requirements of the most recent South African Environmental Legislation with reference to the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983). This act aims to promote the conservation of soil, water sources, vegetation, and the control of weeds and invader plants through the management of natural agricultural resources.

The proposed study thus aims to determine the possible impacts that the proposed development could have on the soils, land use, land capability and agricultural potential and to also identify areas of high sensitivity regarding the proposed project. This is done by taking into consideration factors such as soil quality, drainage, topography, climate and water

availability. Therefore, provide sufficient information that can help to ensure that land is used in a sustainable and responsible way.

The study objective will be achieved through determining:

- The soil forms occurring within the study area;
- The associated land capability and potential of the soils occurring within the study area;
- Discussion of the agricultural potential in terms of the soils, water availability, surrounding development and current status of land; and
- Discussion of potential and actual impacts as a result of the proposed development.

1.2 Suitability of soils for agricultural cultivation

The assessment of soils suitability for agricultural cultivation rests primarily on the identification of soils that are suited to crop production. In order to classify soils as being of suitable for crop cultivation they must have the following properties:

- Adequate depth (greater than 60 cm) to accommodate root development for 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 to increase crop choice variety.

1.3 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:

- Soils and land capability are protected under the National Environmental Management Act 107 of 1998, the Minerals Act 28 of 2002 and the Conservation of Agricultural Resources Act 43 of 1983.

- The National Environmental Management 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 by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.
- Government Notice R983 of 4 December 2014, Activity 21. The purpose of this notice is to identify activities that would require environmental authorisation prior to commencement of that activity.

1.4 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 soil potential associated with the identified soil forms present in the study area;
- Compile soil, land use and land capability and impact statement report under current on-site conditions based on the field finding data to be compared to the screening tool.

1.5 Assumptions, Assumptions uncertainties, limitations and gaps

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

- The soil delineations as well as the associated land capability and agricultural potential was done at a high level due the low quantum of risk presented by the proposed

development and therefore should not be used for any other purpose than it is intended for. Should the quantum of risk of the project change for any reason, then a detailed soil investigation, delineation and classification would have to be undertaken in fulfilment of the applicable legislation;

- The soil survey was confined to the study area outline with consideration of various land uses outside the study area considered;
- Soil profiles were observed using a 1.5m hand-held soil auger and thus a description of the soil characteristics deeper than 1.5m cannot be given; and
- Soils exist in a continuum; it is often difficult to classify any particular soil type. As a consequence, the soil classifications presented in this report are based on the "best fit" to the soil classification system of South Africa.

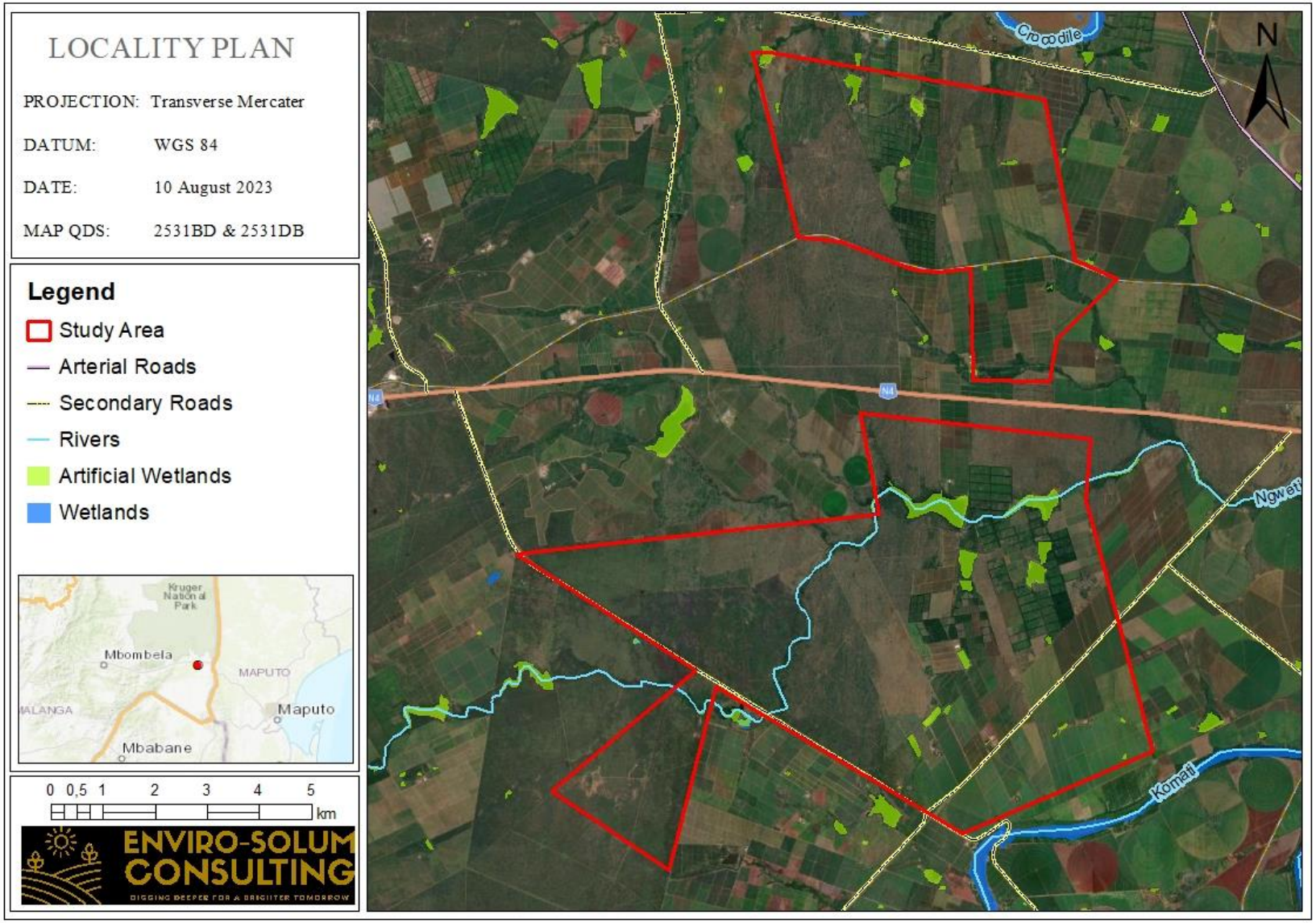

Figure 1: Digital satellite imagery depicting the locality of the study area.

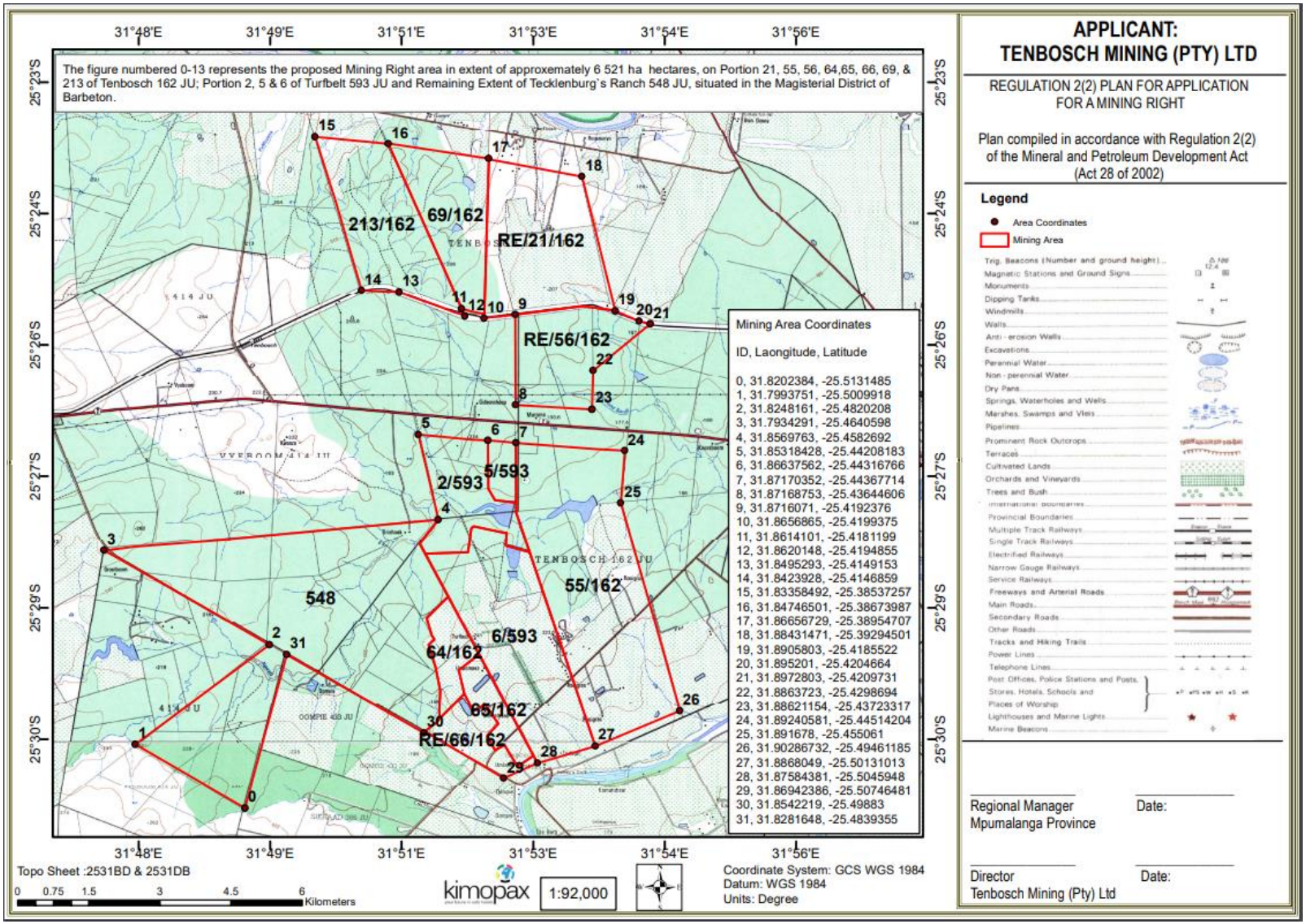

Figure 2: Topographic locality of the study area and the associated farm portions.

2. METHODOLOGY

The assessment of agricultural potential of the study area was based on a combination of desktop studies to amass general information and then through site visit for status quo assessment, soil classification and characterisation, and the validation of generated information from the desktop studies.

2.1 Desktop Study and Literature Review

A literature review and background study were carried out prior to beginning the field assessment to gather predetermined soil, land use, and land capability data in the study area. In order to validate the predetermined soil results obtained at the desktop level, a field investigation was conducted.

2.2 Site Survey

The field survey was conducted in August 2023 in which soils were classified into soil forms according to the Soil Classification System: A Natural and Anthropogenic System for South Africa Soil Classification System (2018).

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 (i) the risks of land damage from erosion and other causes and (ii) the difficulties in land use owing to physical land characteristics, including climate. Eight land capability classes were employed with potential decreasing and limitations and hazards increasing from class 1 to class 8. Classes 1 to 4 can be considered as arable, whereas Class 5 to 7 may be classified as wetland or watercourses, grazing, forestry or wildlife. The climate capability of an area as indicated in Table 2 below influences the land potential of an area. As part of the mitigation measures, the expected impacts of the proposed land use on soil and land capability were assessed.

Table 1: Land Capability Classification (Smith, 2006).

Land Capability Group	Land Capability Class	Intensity of Land Use									
		wildlife	Forestry	Light grazing	Moderate grazing	Intensive grazing	Light cultivation	Moderate cultivation	Intensive cultivation	Very intensive cultivation	Limitations
Arable	I										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.

Table 2: Climate Capability Classification (Scotney *et al*., 1987).

Climate Capability Class	Limitation Rating	Description
C1	None to slight	Local climate is favourable for good yield for a wide range of adapted crops throughout the year.
C2	Slight	Local climate is favourable for good yield for a wide range of adapted crops and a year-round growing season. Moisture stress and lower temperatures increase risk and decrease yields relative to C1.
C3	Slight to moderate	Slightly restricted growing season due to the occurrence of low temperatures and frost. Good yield potential for a moderate range of adapted crops.
C4	Moderate	Moderately restricted growing season due to low temperatures and severe frost. Good yield potential for a moderate range of adapted crops but planting date options more limited than C3.
C5	Moderate to severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Suitable crops may be grown at risk of some yield loss.
C6	Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Limited suitable crops for which frequently experience yield loss.
C7	Severe to very severe	Severely restricted choice of crops due to heat, cold and/or moisture stress.
C8	Very severe	Very severely restricted choice of crops due to heat and moisture stress. Suitable crops at high risk of yield loss.

Climatic criteria, within the growing season, incorporate rainfall, evaporation, minimum and maximum temperatures as well as limitations linked to frost, wind and hail hazards. When assessing climatic factors, the system provides a dual approach, whereby permanent terrain and soil factors can be used to define soil capability, while with the addition of climatic factors can then be used to determine land potential (Scotney *et al*., 1991). However, the authors recommend the use of the overarching land capability classification in rainfed production environments, while soil capability can be used to comparatively rate soil capability of different areas. Table 3 below presents the land capability classes, whilst Table 4 presents a description thereof, according to Guy and Smith (1998).

Table 3: Land Potential Classes (Smith, 2006).

Soil Capability Class	Climate Capability Class							
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**
I	L1	L1	L2	L2	L3	L3	L4	L4
II	L1	L2	L2	L3	L3	L4	L4	L5
III	L2	L2	L3	L3	L4	L4	L5	L6
IV	L2	L3	L3	L4	L4	L5	L5	L6
V	(L3) Wet-based	(L3) Wet-based	(L4) Wet-based	(L4) Wet-based	(L5) Wet-based	(L5) Wet-based	(L6) Wet-based	(L6) Wet-based
VI	L4	L4	L5	L5	L5	L6	L6	L7
VII	L5	L5	L6	L6	L7	L7	L7	L8
VIII	L6	L6	L7	L7	L8	L8	L8	L8

Table 4: The Land Capability Classes Description (Adapted from Guy and Smith, 1998).

Land Capability	Description of Land Capability Class
L1	**Very high Capability:** No limitations. Appropriate contour protection must be implemented and inspected.
L2	**High Capability:** Very infrequent and/or minor limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L3	**Good Capability:** Infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L4	**Moderate Capability:** Moderately regular and/or severe to moderate limitations due to soil, slope, temperature or rainfall. Appropriate permission is required before ploughing virgin land.
L5	**Restricted Capability:** Regular and/or moderate to severe limitations due to soil, slope, temperature or rainfall.
L6	**Very restricted Capability:** Regular and/or severe limitations due to soil, slope, temperature or rainfall. Non-arable.
L7	**Low Capability:** Severe limitations due to soil, slope, temperature or rainfall. Non-arable.
L8	**Very low Capability:** Very severe limitations due to soil, slope, temperature or rainfall. Non-arable.

2.4 DAFF Screening Tool

The Agricultural Agro-Ecosystem Assessment protocol provides the criteria for the assessment and reporting of impacts on agricultural resources for activities requiring environmental authorisation. 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 as provided by the Department of Agriculture, Forestry and Fisheries. The national web-based environmental screening tool can be accessed at: https://screening.environment.gov.za/screeningtool .

The main purpose of the Agricultural Agro-Ecosystem Assessment is to ensure that the sensitivity of the site to the proposed land use change (from potential agricultural land to the proposed development) is sufficiently considered. The information provided in this report aims to enable the Competent Authority to come to a sound conclusion on the impact of the proposed development on the food production potential of the site.

To meet this objective, site sensitivity verification must be conducted of which the results must meet the following objectives:

- It must confirm or dispute the current land use and the environmental sensitivity as was 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 in the event where 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.

The report is thus compiled in a manner that meets the minimum report content requirements for impacts on agricultural resources by the proposed development.

3. RESULTS AND DISCUSSIONS

3.1 Desktop Assessment Results

3.1.1 Climatic Data

The study area falls within the hot semi-arid climate zone characterised by hot summers and warm to cool winters, and minimal precipitation, with potential evapotranspiration exceeding precipitation on average. The mean annual rainfall is between 601 – 800 mm and this rainfall is deemed adequate to support rainfed agriculture. However, planting dates and length of growing season may be affected and need to be carefully considered. Figure 3 below depicts the mean annual rainfall associated with the study area.

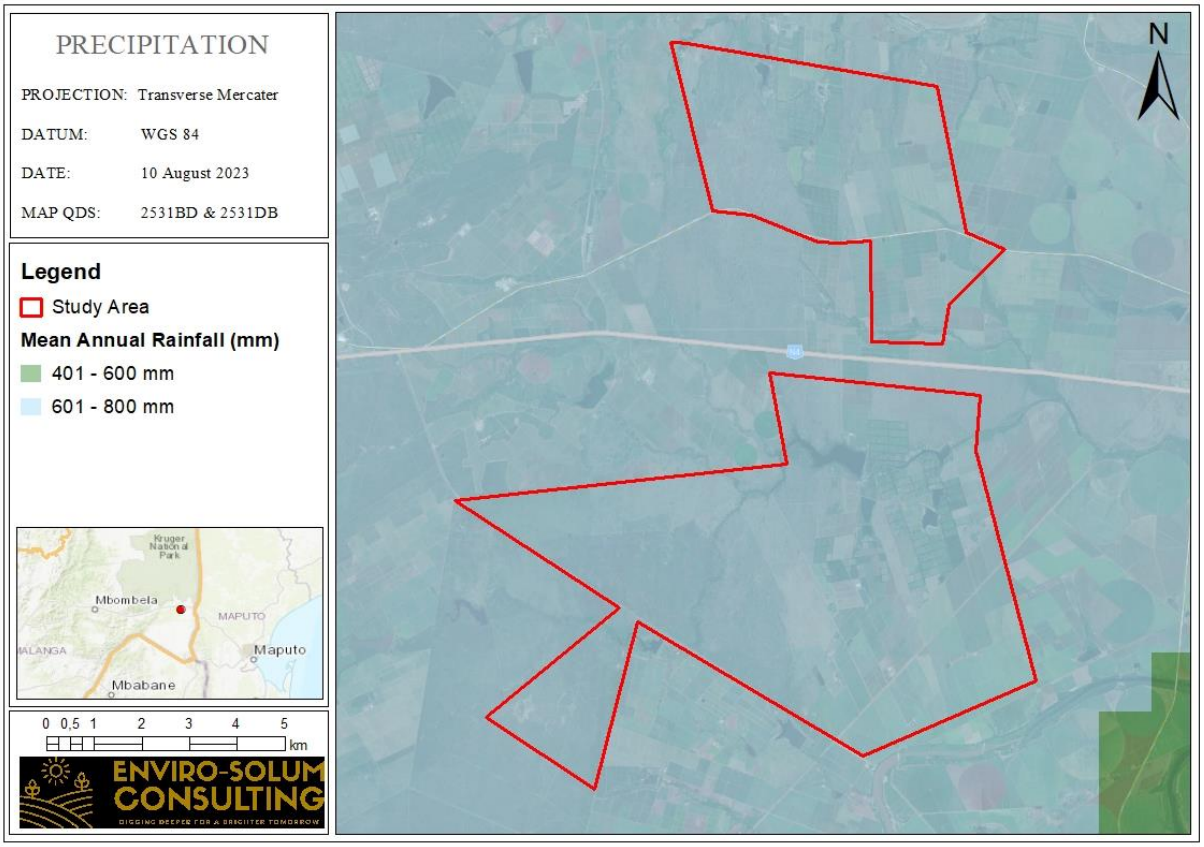

Figure 3: Mean Annual Rainfall associated with the project area.

3.1.2 Lithology Classes

The lithology classes associated with the study area include the Barbeton along the western portion, the Beaufort in the mid sections and the Drakensberg along the eastern portion of the study area. Figure 4 below depicts the geology associated with the project area.

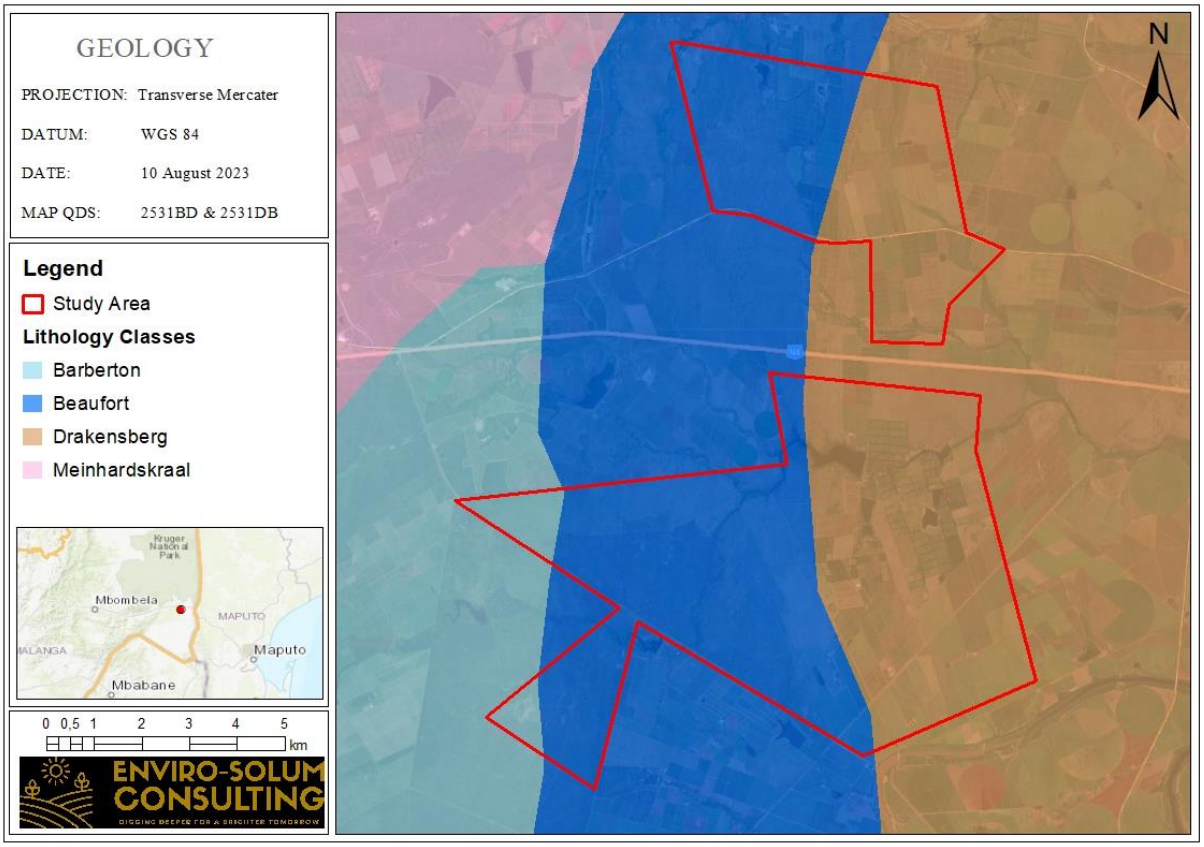

Figure 4: Lithology classes associated with the project area.

3.1.3 *Clay Content*

The southwestern corner of the study area is characterised by clay content less than 15%. The lower clay content indicates that these soils will allow root penetration and water infiltration and these soils tend allow for easy use of tillage implements. However, these soils tend to have low fertility status and low water holding capacity which may necessitate additional input costs to cultivate successfully. The western portion of the study area is characterised by is characterised by clay content between 15% and 35%, which is considered to be within the ideal range for successful cultivation of most crops. The eastern portion of the study area is characterised by clay contents greater than 35% which may not be ideal for most cultivated crops due to limited root penetration and highly prone to waterlogging conditions during the rainy season. Figure 5 below depicts the clay percentages associated with soils occurring within the study area.

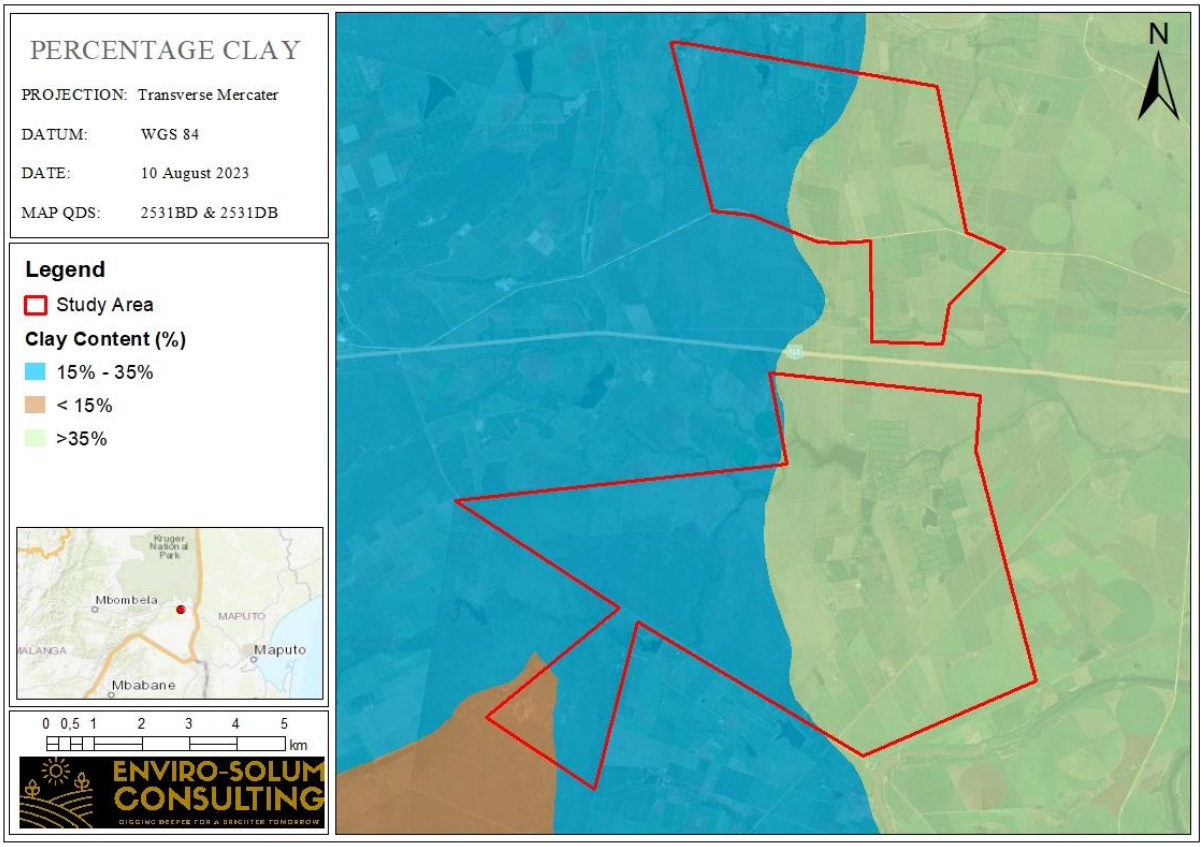

Figure 5: Clay Content associated with the project area.

3.1.4 Soil pH

The soil pH associated with the soils of the study area is between 6.5 to 7.4 which is slightly acidic to neutral. This pH range is considered ideal for most cultivated crops and majority of plant nutrients can be available for uptake by plants. Figure 6 below depicts the soil pH associated with soils occurring within the study area.

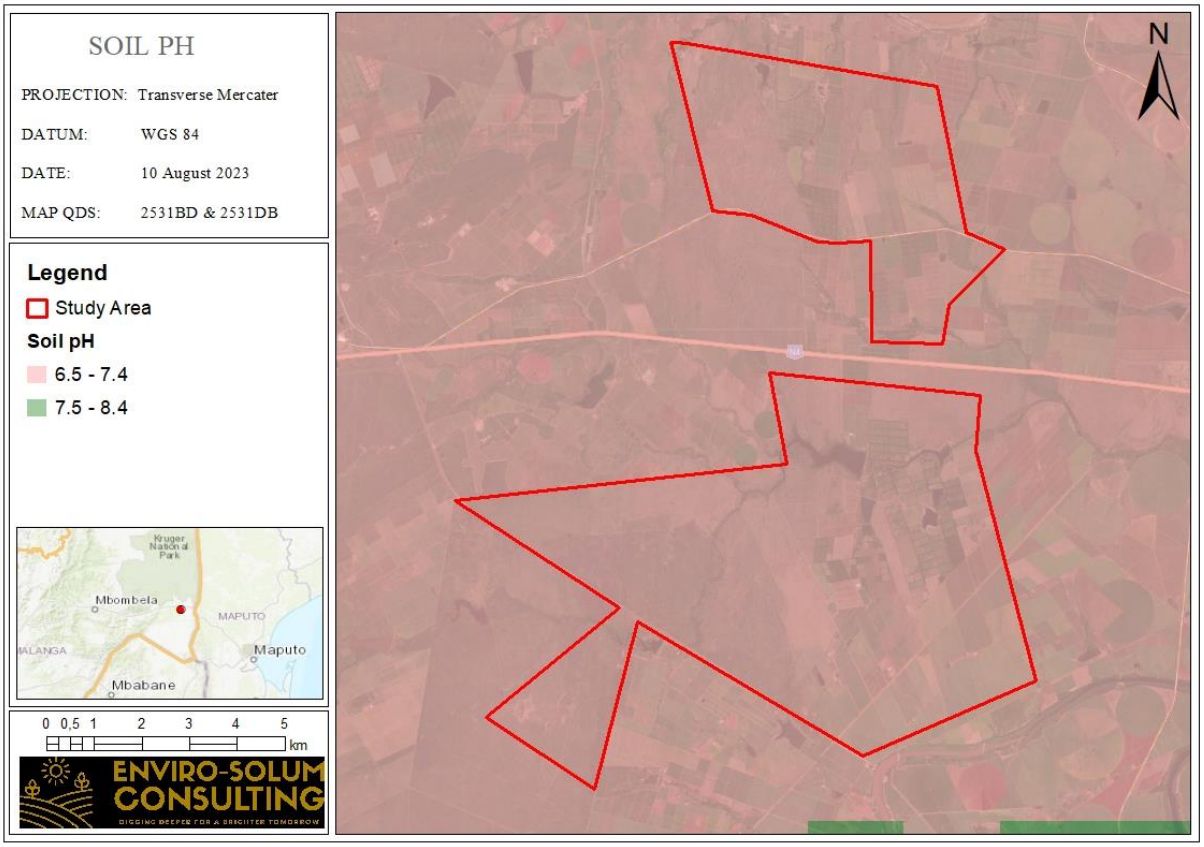

Figure 6: Soil pH associated with the project area.

3.1.5 *Landtype Data*

The study area is characterised the Dc34, Ea75, Ea76, Ea78 and the Fb65 landtype classes. The Ea landtypes dominate much of the study area and these landtypes are characterised by dark and red coloured, structured and high base status soils. The Dc34 landtype situated north of the study area is characterised by one or more of: vertic, melanic, red structured diagnostic horizons; undifferentiated. High clay content, cracking soils are dominant. Cultivation on these soils can be difficult due to the high clay content which may impede root penetration. The Fb landtype situated along the southwestern portion of the study area and are characterised by pedologically young and shallow/rocky soils with lime rare or absent in upland soils but generally present in the low-lying soils. These soils are shallow and usually left intentionally for grazing and wilderness land uses. Figure 7 below depicts the landtype classes associated with the study area.

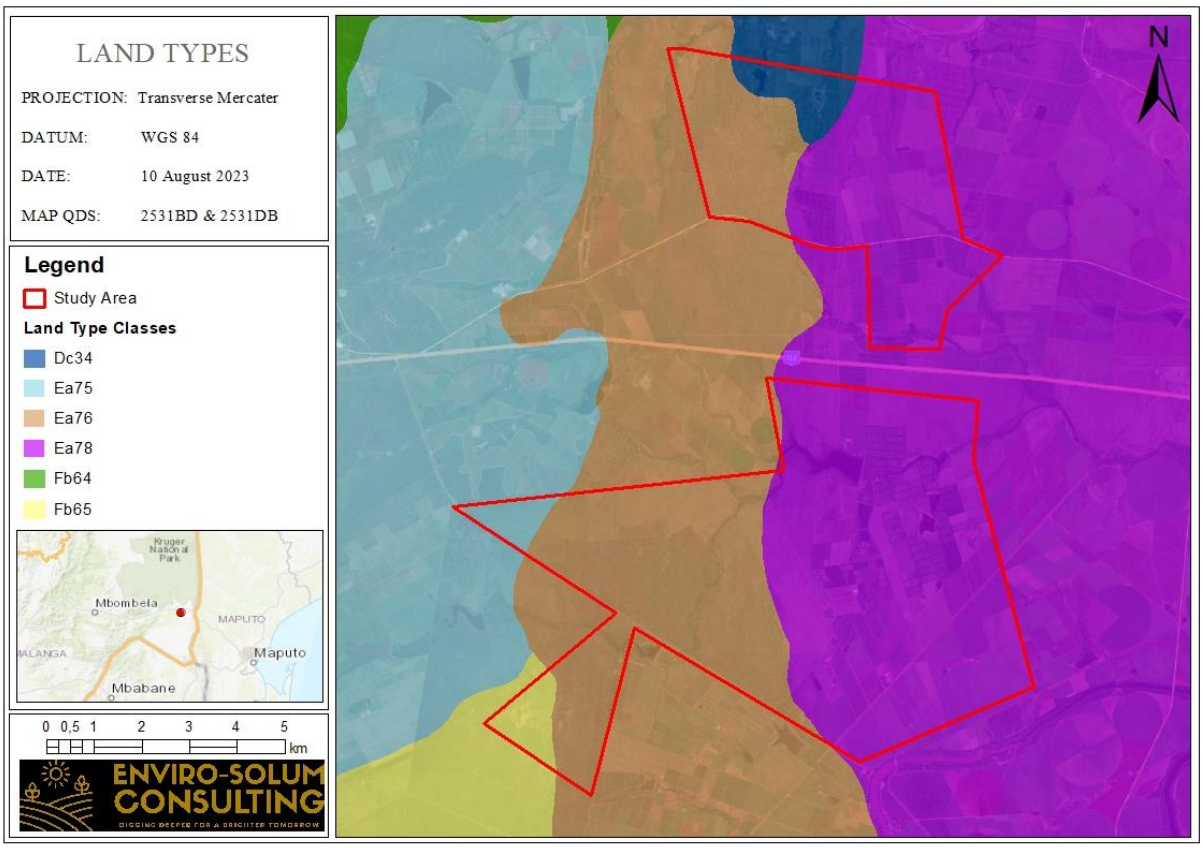

Figure 7: Landtypes associated with the study area.

3.1.6 Desktop Soil Potential

The soil potential associated with the study area is characterised by soils of poor suitability for arable agriculture along the mid sections of the study area. The eastern portion of the study area is characterised by soils of intermediate suitability for arable agriculture where climate permits. Figure 8 below depicts the desktop soil potential associated with the study area.

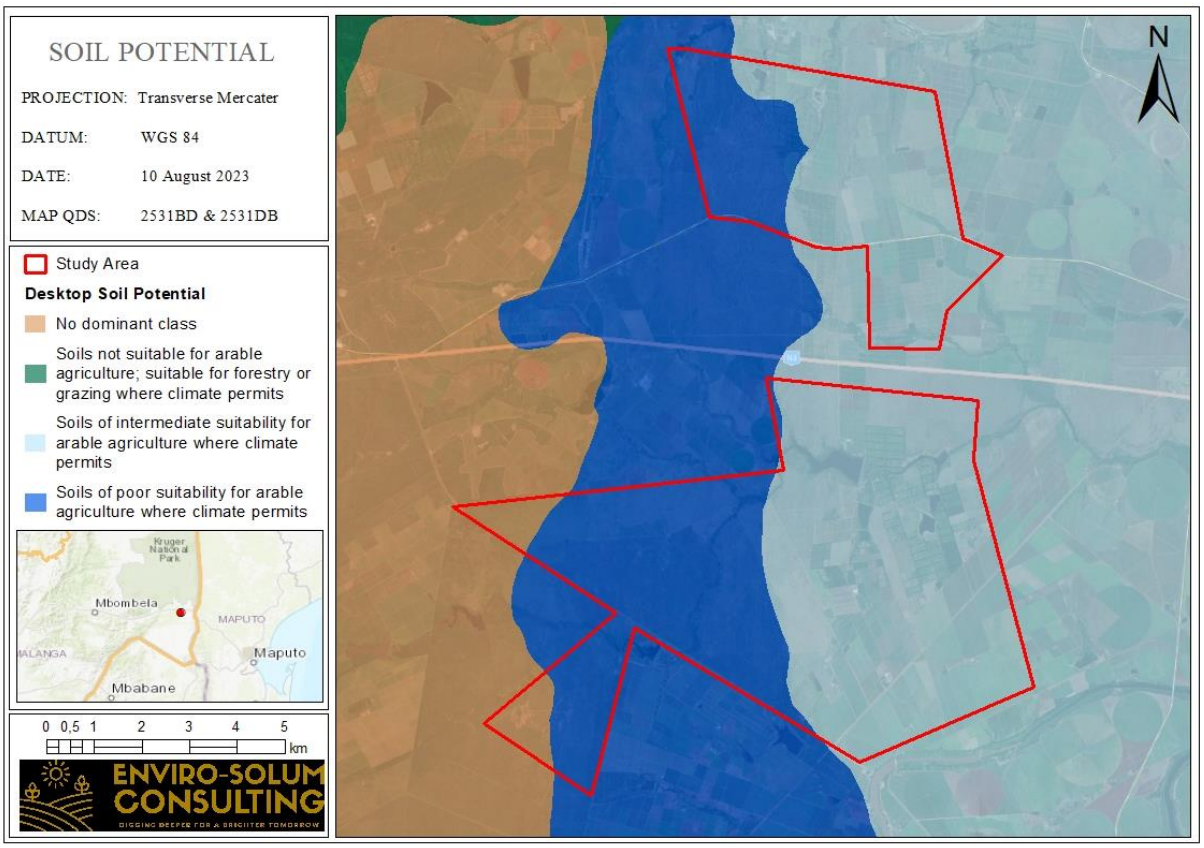

Figure 8: Soil potential associated with the study area.

3.1.7 Historical Land Use

The historical land use associated with the study area is cultivated lands and vacant/unspecified land which is typically used for grazing purposes or wildlife. Figure 9 below shows the historical land uses associated with the study area.

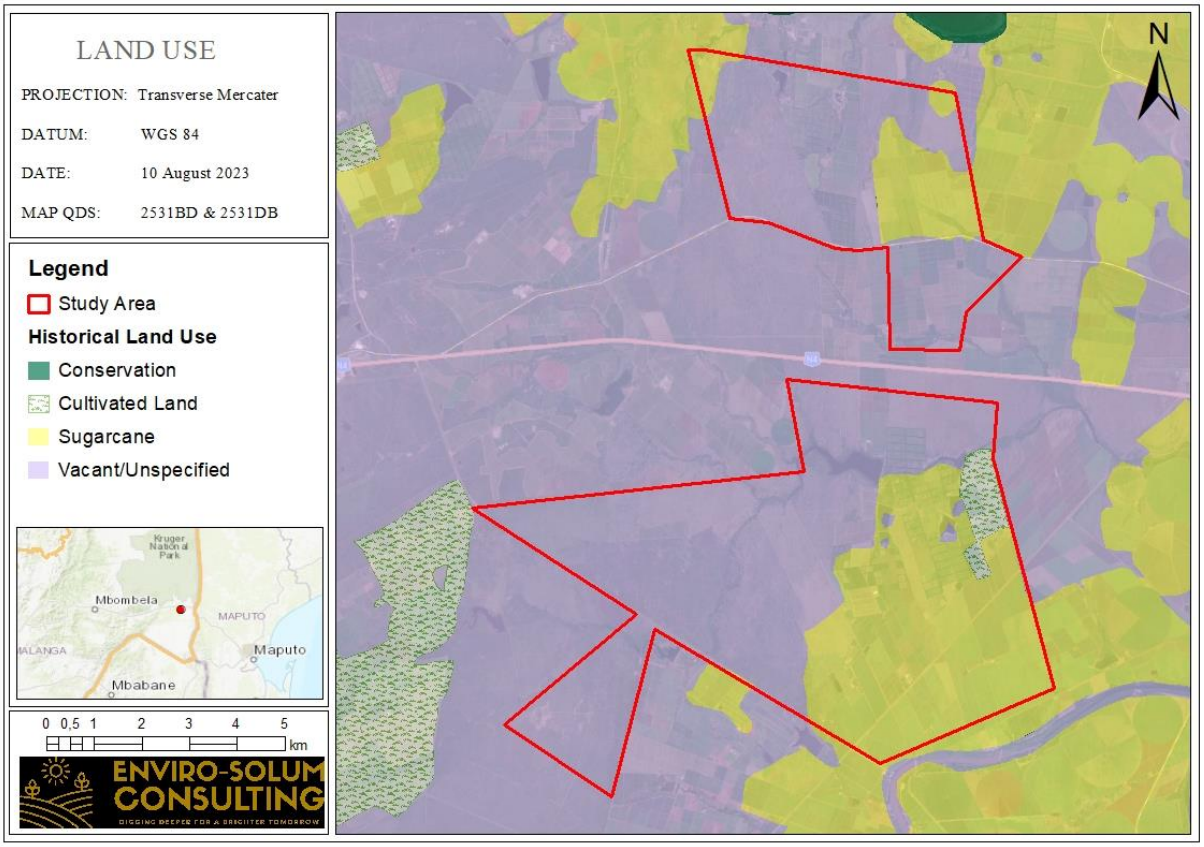

Figure 9: Historical land use associated with the study area.

3.1.8 DAFF Screening Tool

The project area is characterised by a high sensitivity to agriculture (Figure 8).

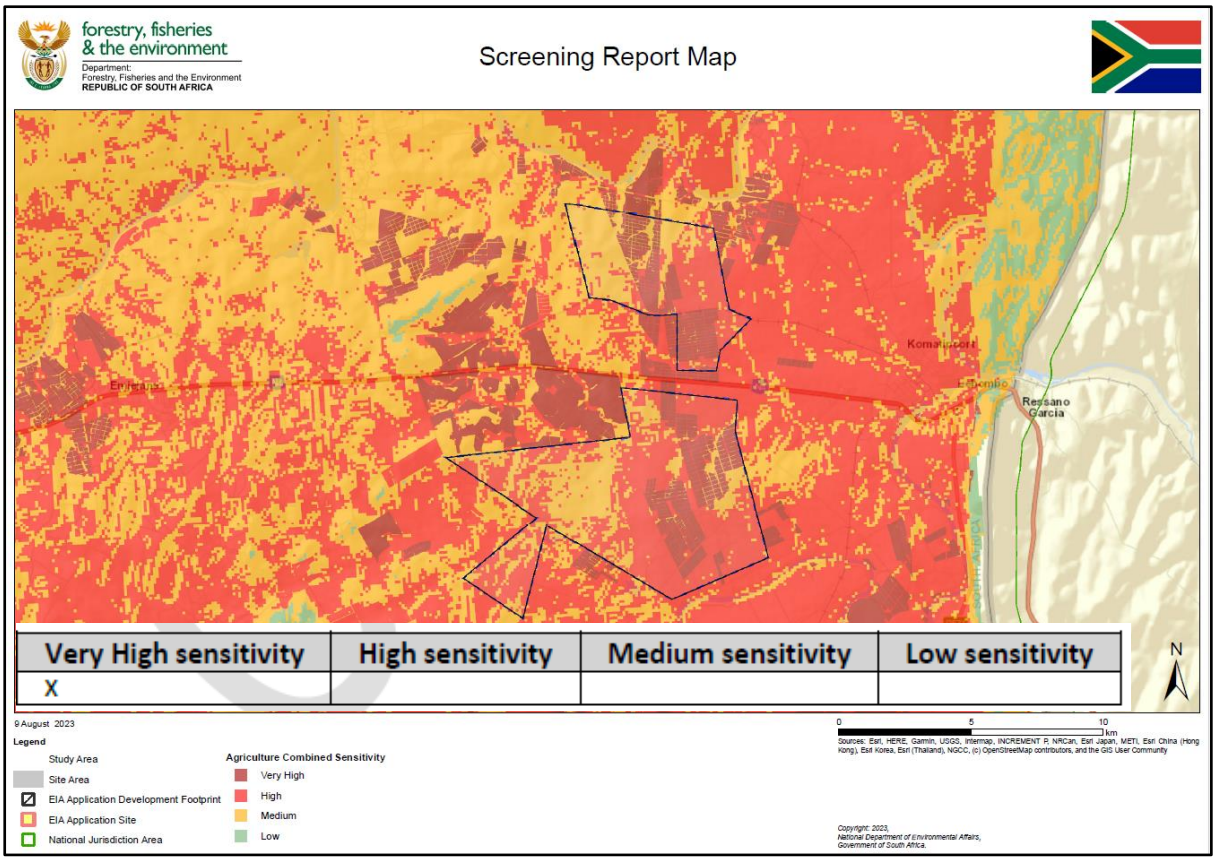

Figure 10: Screening tool sensitivity.

3.2 Identified Land Uses within the Study Area

The identified land uses within the study area include the plantations of sugarcane, bananas and citrus, livestock farming and commercial accommodation establishments (guest houses and lodges. Figure 11 below illustrates the various land uses identified within the study area.

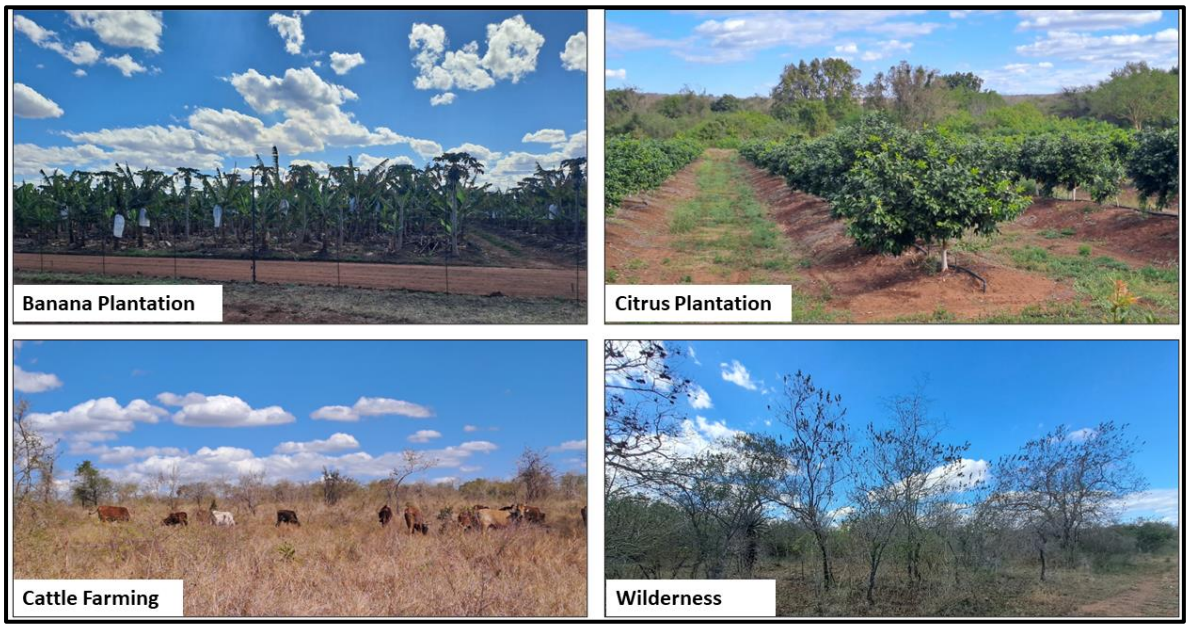

Figure 11: Various land uses associated with the study area.

3.3 Soil Form in the Study Area

Based on the observations during the site assessment, the dominant soils occurring within the study area are Cartref, Inhoek, Mayo/Glenrosa, Mayo/Milkwood, Shortlands/Stanger, Stanger/Darnall and Swarland/Valrivier.

Mayo/Glenrosa

The Mayo/Glenrosa are typically shallow in nature. The shallow depth can be attributed to limited rock weathering and convex topographical conditions at the crest or scarp of a hillslope resulting in removal of soil and in some instance leaving rocky outcrops behind. Based on the degree of weathering some lithic material of varying sizes can be mixed intimately with soil material. These types of soils are usually avoided for intensive use and thus left for grazing, forestry, and wildlife land uses unless intense management strategies are used such as breaking of the plough layer. Figure 12 below depicts the shallow Mayo/Glenrosa soil forms.

Figure 12: View of the identified shallow Mayo/Glenrosa soil forms.

Swartland/Valsrivier

The soils of duplex character such as the Swartland/Valsrivier formation are characterised by moderately to strongly structured soils with a clear textural distinction between a sandier surface horizon and a higher clay upper subsurface horizon. These types of soils are typically not preferred for cultivation due to the high clay content, strong structure and are prone to waterlogging (highly impermeable when wet). Waterlogging conditions make these soils prone experiencing runoff during high rainfall events and thus the formation of erosion gullies over time. Nonetheless, should these soils be cultivated, intensive management practices would be required. Figure 13 below illustrates the high in clay and strong structured soils associated with the Swartland/Valsrivier formation.

Figure 13: View of the identified Swartland/Valsrivier soil form.

Shortlands/Stanger and Stanger/Darnall

These soils are considered to be of moderate agricultural potential due to the strongly developed structure and the high clay content of the pedocutanic and the red structured horizons, which may effectively reduce the water infiltration and thus more prone to waterlogging conditions or intensified runoff during high intensity rainfall events. The strongly developed structure of the soils may impede root growth and consequently limit the area to mostly a few selected crops and grazing capability. The soils may be deemed fertile according to Fey (2010), but they require irrigation and intensive management strategies to be cultivated on. Figure 14 below illustrates the identified Shortlands, Stanger and Darnall associated soil horizons.

Figure 14: View of the identified Shortlands/Stanger and Stanger/Darnall soil form.

Cartref

These soils are characterised by the presence of an albic horizon and unconsolidated soil material depicting evidence of saturation below the orthic A horizon. The albic horizon is characterised by a bleached appearance which signals lateral movement of water. In some instances, due to the limited weathering occurring in the landscapes, some unconsolidated soil material with limited evidence of pedogenesis depict evidence of water saturation or gleyic properties. These soils function as seep wetlands in most cases which are prone to waterlogging conditions thus resulting in anaerobic conditions not favourable for most cultivated crops. Figure 15 below depicts the albic horizons associated with the Cartref soil formation.

Figure 15: View of the identified Cartref soil formation.

Inhoek

The Inhoek soils form is associated with watercourses due to the unconsolidated soil material as a result of deposition by water. These soils are characterised by little evidence of pedogenic horizonation and the presence of clear stratifications may be observed. These soils may contain weathered hard rock fragments sometimes identified as pebbles. These soils typically occur on low lying terrain positions. Figure 16 below shows the watercourses associated with the Inhoek soil formation.

Figure 16: View of the identified watercourses associated with the Inhoek soil formation.

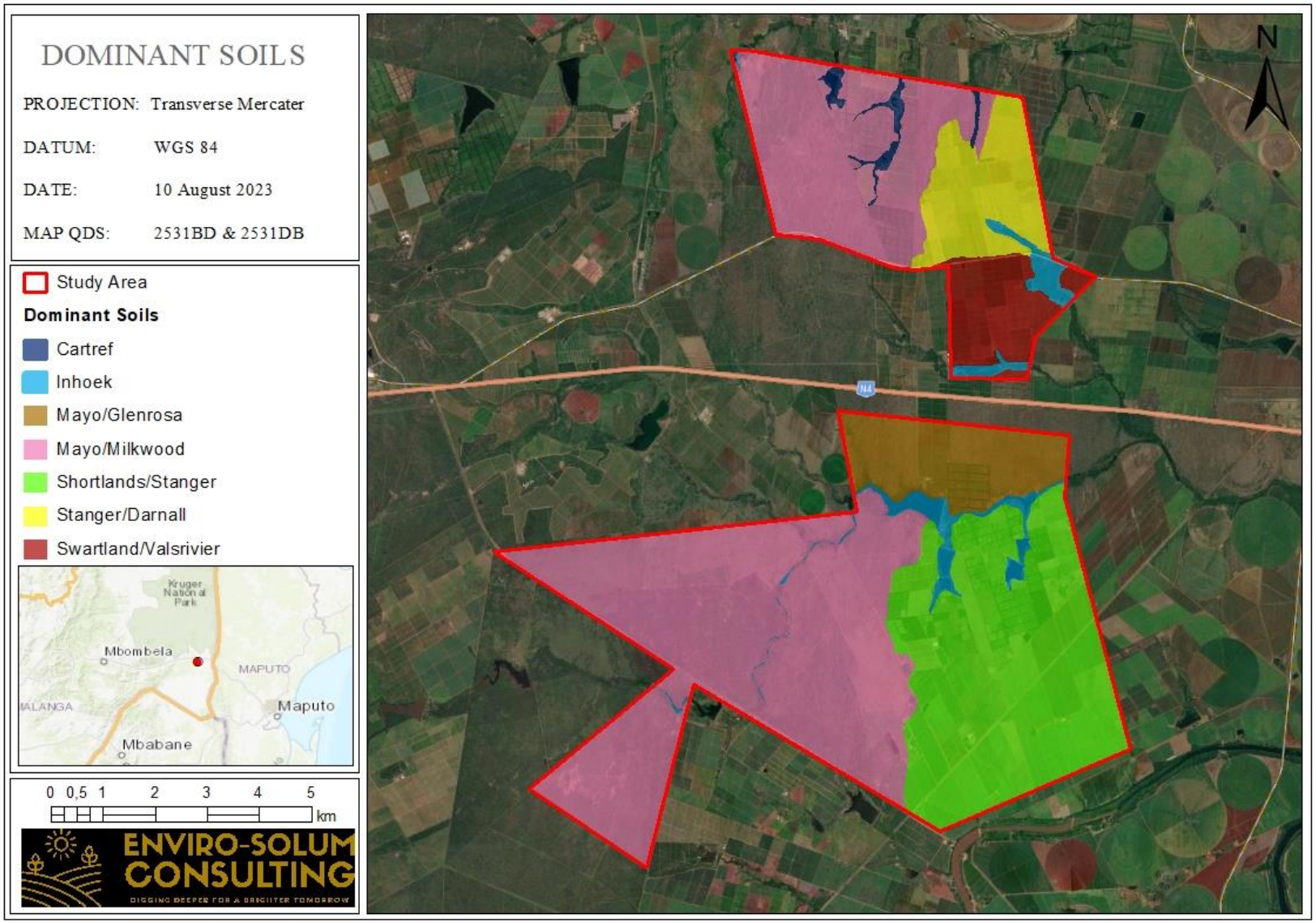

Figure 17: Dominant soils forms within the study area outline.

3.4 Agricultural Potential and Sensitivity

Agricultural sensitivity in South Africa is generally restricted by climatic conditions, with specific mention to water availability (rainfall). Even within similar climatic zones, different soil types typically have different land use capabilities and agricultural sensitivities attributed to their inherent characteristics. Highly sensitive agricultural land is defined as having the soil and terrain quality, growing season and adequate available moisture supply needed to produce sustained economically high crop yields when treated and managed according to best possible farming practices (Scotney *et al*., 1987).

For this assessment, agricultural sensitivity was inferred in consideration of observed limitations to land use due to physical soil properties and prevailing climatic conditions. Figure 17 below depict the land capability of the soils identified within the study area, while Figure 18 below depicts the agricultural potential associated with the study area.

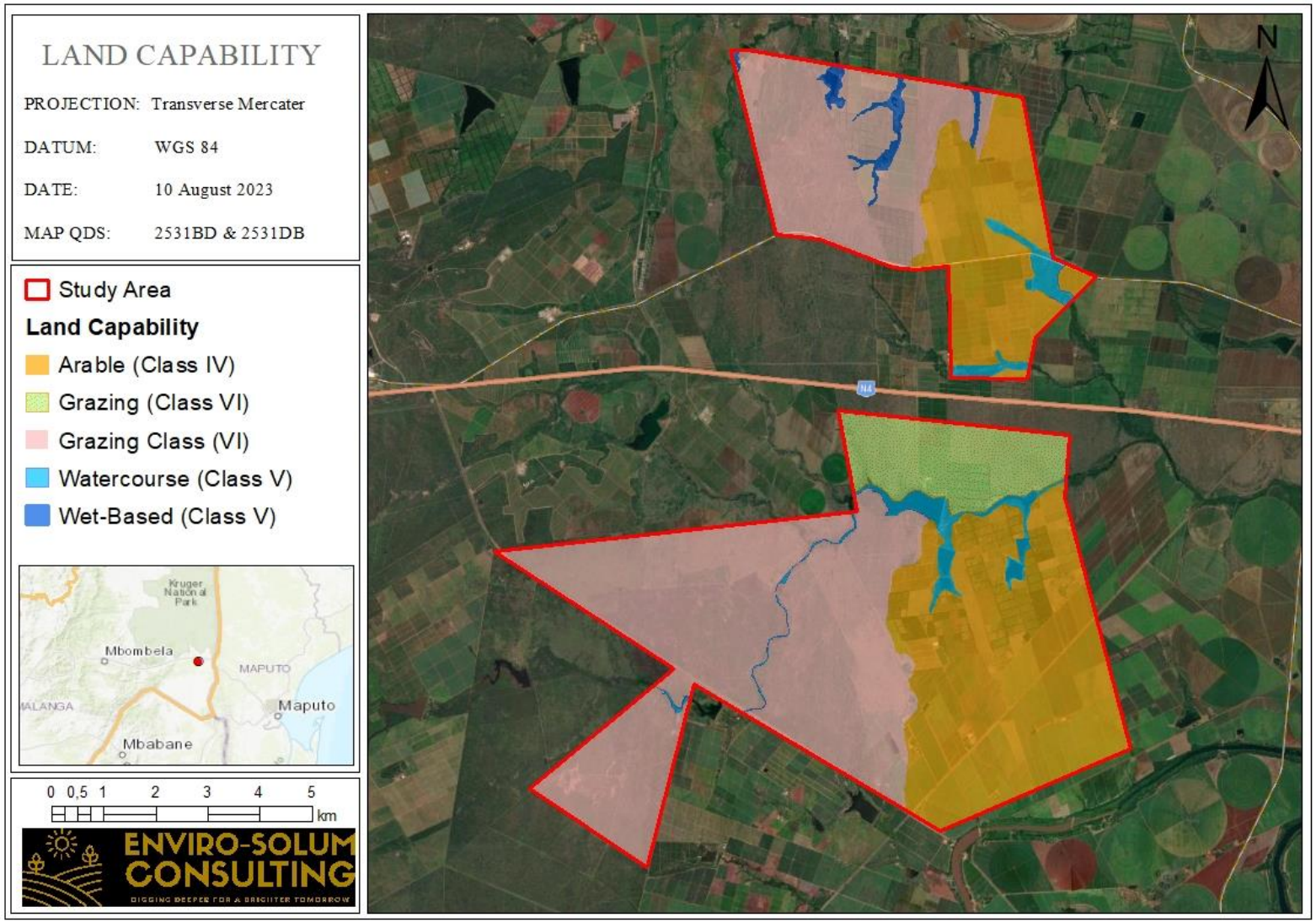

Figure 18: Map depicting Land capability of soils occurring within the study area.

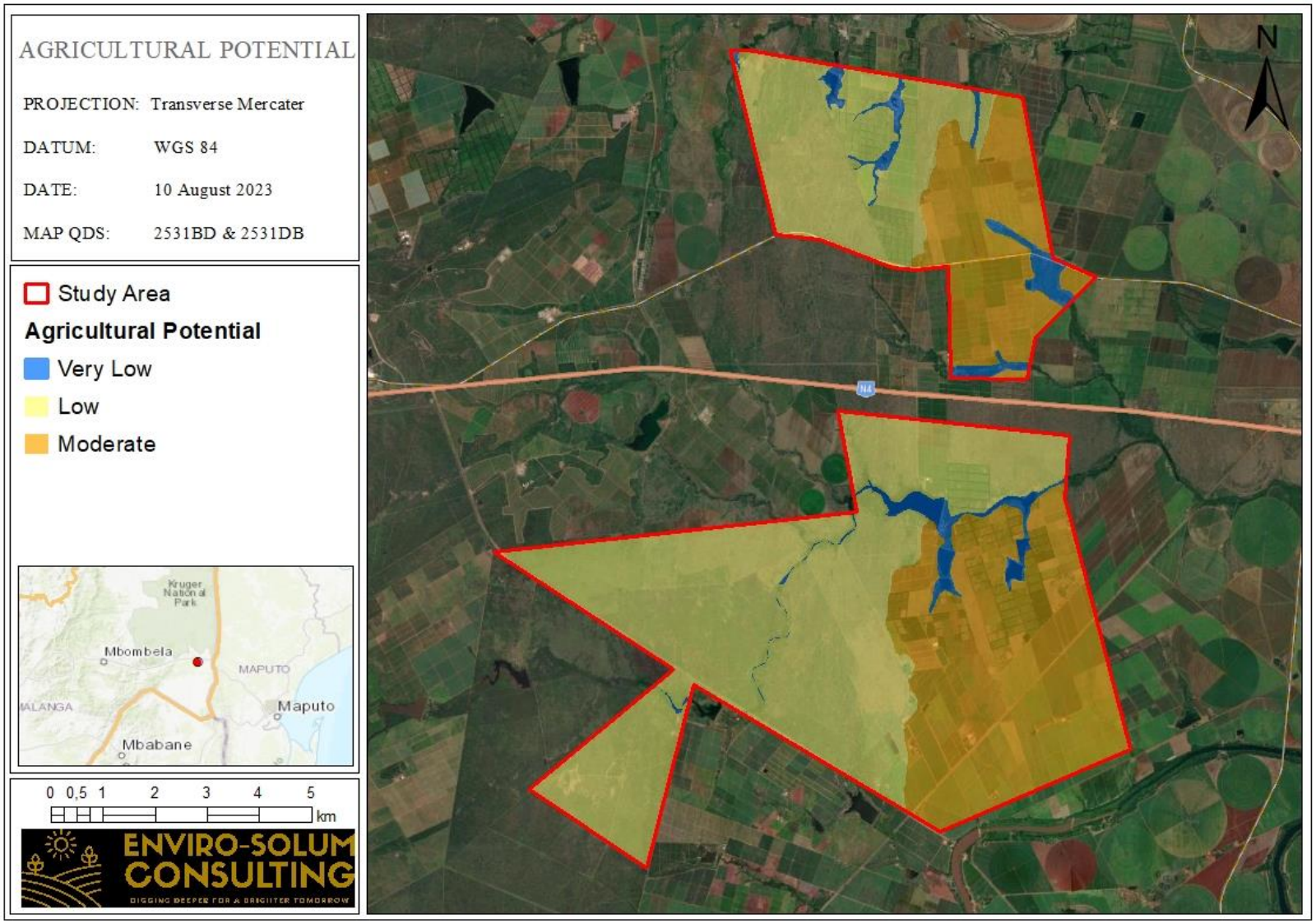

Figure 19: Map depicting the agricultural potential of soils occurring within the study area.

4. CONCLUSIONS

4.1 Impact Statement and Screening Tool Verification

It is worth noting that some areas under the plantation of bananas, sugarcane and citrus which are more suited for the soils occurring in the study area are produced under irrigation. Even though, irrigated agriculture utilises large portions of South Africa's water resources, however it is responsible for the production of high value crops and fruits. Therefore, the Preservation and Development of Agricultural Land Framework Bill published on the 18th of September 2020, although not approved yet, stipulates that land under irrigation is automatically regarded as high potential. This is due to the high production capability and the possibility of exponentially increasing yields, and this is of high importance for food security at a local and reginal scale. In most cases there irrigated areas indicate high capital investments made onto the farm.

However, 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 sensitivity. Based on the outcomes of the field assessment this was found to be of a lower significance impact than that presented on the screening tool due to the inherent soil characteristics and climatic constraints for commercialised agricultural production. This can be attributed to the shallow soils and strongly structured, high clay soils identified on site which may require intensified management strategies to be cultivated on. Therefore, the overall impact is anticipated to be moderate and within acceptable levels from a soil and land capability point of view.

Screening Tool Assigned Sensitivity	Verified Sensitivity	Outcome Statement / Plan of Study	Relevant Section Motivating Verification
Very High for most of the study area.	The study area is dominated by shallow soils of lithic character soils which are low sensitivity to very low sensitivity and soils of duplex (high clay and strong structure) character which are of moderate sensitivity.	It is recommended that a detailed Agricultural Impact Assessment must be undertaken in future ***should the prospecting rights application be altered or approved to allow any activities other than non-invasive activities as currently proposed by the applicant that would result in the potential for impacts on soil resources to result from such prospecting activities***. This detailed assessment should also be undertaken for any future mining-right or mining activities-related application for Environmental Authorisation.	Section 3

4.2 Reasoned Opinion for Issuing of EA

The study area is largely dominated by soils of lithic character (hard to cultivate) of the dominant soils, which are of low agricultural potential and account for 64% of the study area. These areas are not under cultivation and thus left for grazing and wilderness uses. The soils of duplex character (high in clay and strongly structured) account for 32% of the study area and are characterised to be of moderate potential and these area are mostly cultivated under irrigation. Lastly the soils associated with the watercourses and wetland features account for 4% of the study area and are characterised to be of very low agricultural potential. Therefore, majority of the study area is not considered ideal for cultivation of crops and thus limited to plantations, grazing and wildlife uses. This is also coupled by the by hot summers and warm to cool winters, and minimal precipitation, with potential evapotranspiration exceeding precipitation on average which limits the choice of crop in the absence of irrigation options.

However, some of the areas currently utilised for plantations and grazing may potentially be impacted, which will ultimately impact on the local and regional livestock and fruit production to a degree. Therefore, areas under plantations should afforded protection in line with the mitigation hierarchy to minimise impact on soil resources and achieve sustainable development. Overall, the soil assessment was done at a high level due the low quantum of risk presented by the proposed development and therefore should not be used for any other purpose then it is intended for. Should the quantum of risk of the project change for any reason, then a detailed soil investigation, delineation and classification may have to be undertaken in fulfilment of the applicable legislation.

Agricultural Sensitivity	Hectares (ha)	Percentage (%)
Low	4800	64
Moderate	2400	32
Very Low	300	4
Total	**7500**	**100**

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 will be made in support of the principles of Integrated Environmental Management (IEM) and sustainable development.

5. REFERENCES

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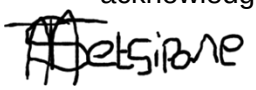
APPENDIX A: INDEMNITY

- 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)
14 August 2023

APPENDIX B: DETAILS, EXPERTISE AND CURRICULUM VITAE OF SPECIALISTS

1. (a) (i) Details of the specialist who prepared the report

Tshiamo Setsipane M.Sc. Soil Science (University of the Free State)

1. (a). (ii) The expertise of that specialist to compile a specialist report

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Registration / Associations	Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP) Member of the Soil Science Society of South Africa (Ref: SSSSA-1165) Member of the South African Soil Surveyors Association (SASSO)		