AGRICULTURAL COMPLAINCE STATMENT FOR PORTION 250 OF FARM 745, GOEDGELOOF

PREPARED FOR

ECO ROUTE

MAY 2023

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BACKGROUND TO THE STUDY

Digital Soils Africa (Pty) LTD (DSA) were tasked by Eco Route to undertake an Agricultural Compliance Statement for the Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014. As per GN960 of 2019, read with Section 24(5)(a) of the NEMA. An Environmental Screening Report (ESR) was generated for the application using the National Web-based Screening Tool. The ESR classifies the area as being of high sensitivity for the *Agricultural* theme.

During the site verification, the sensitivity was reduced to moderate. The Compliance Statement is reported according to the protocol for the specialist assessment and minimum report content requirements for the environmental impacts on agricultural resources (GN320 of 2020).

The study area is located on Portion 250 of Farm 745, Goed Geloof, Humansdorp, in the Eastern Cape Province.

FIGURE 1: LOCATION OF THE STUDY AREA IN THE EASTERN CAPE PROVINCE.

ENVIRONMENTAL SCREENING TOOL

Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

All cultivated land is considered a high sensitivity, while irrigation and unique crops, are considered very high sensitivity, irrespective of the land capability. The land use in the screening tool is based on the South African Nation Land Cover (SANLC, 2014). Meanwhile, there have been two more updated versions of the land use (2018 and 2020).

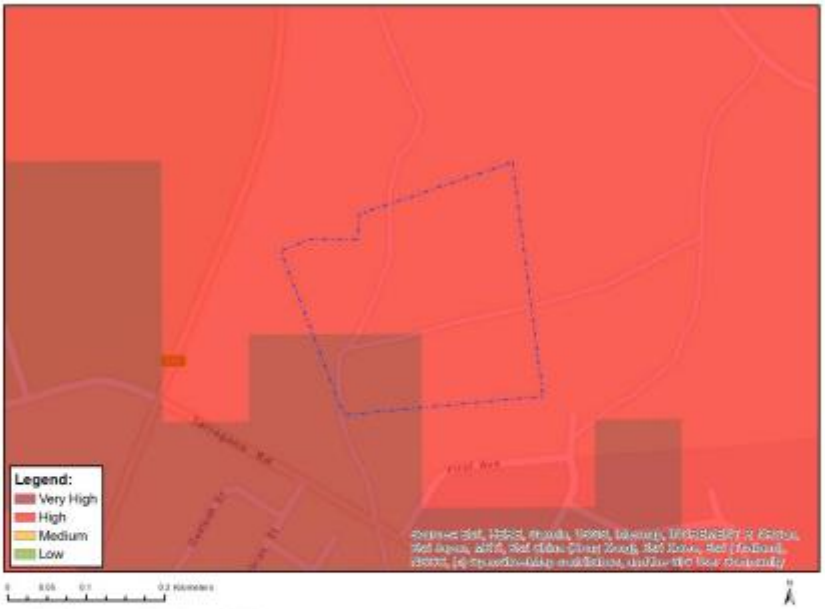
According to the Department of Agriculture, Forestry and Fisheries (2017), land capability is defined as the most intensive long-term use of land for purposes of rainfed farming determined by the interaction of climate, soil, and terrain. The following weight was given to each attribute when calculating the Land Capability:

Land capability = Climate (40%) + Terrain (30%) + Soil (30%)

ACCORDING TO THE NATIONAL WEB BASED ENVIRONMENTAL SCREENING TOOL, THE AGRICULTURAL SENSITIVITY IS CLASSIFIED AS VERY HIGH AGRICULTURAL SENSITIVITY (FIGURE 2), THIS IS DUE LAND CAPABILITY (DAFF, 2017) CLASSIFIES THE SOILS AS HAVING A LAND CAPABILITY VALUES OF GREATER THAN 11 (

Figure 3). The are no cropped fields on the site (Figure 4).

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
Very High	Land capability;11. High/12. High-Very high/13. High-Very high/14. Very high/15. Very high

FIGURE 2: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL.

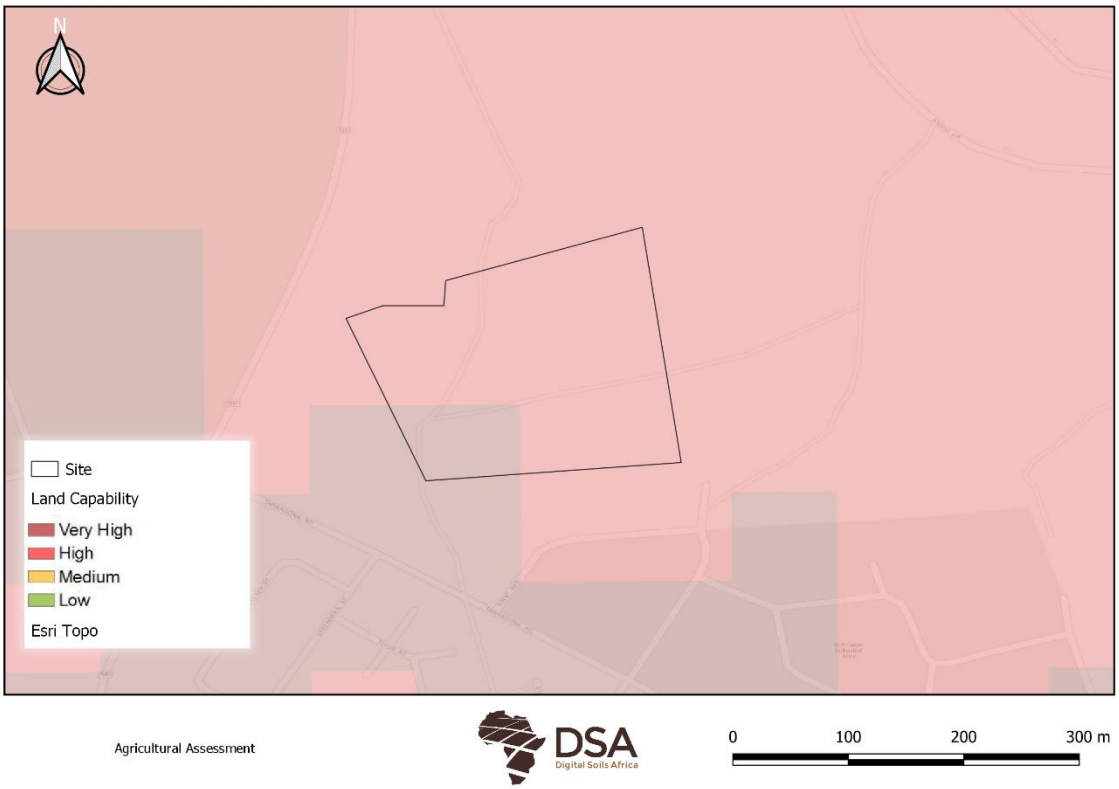


FIGURE 3:THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL.

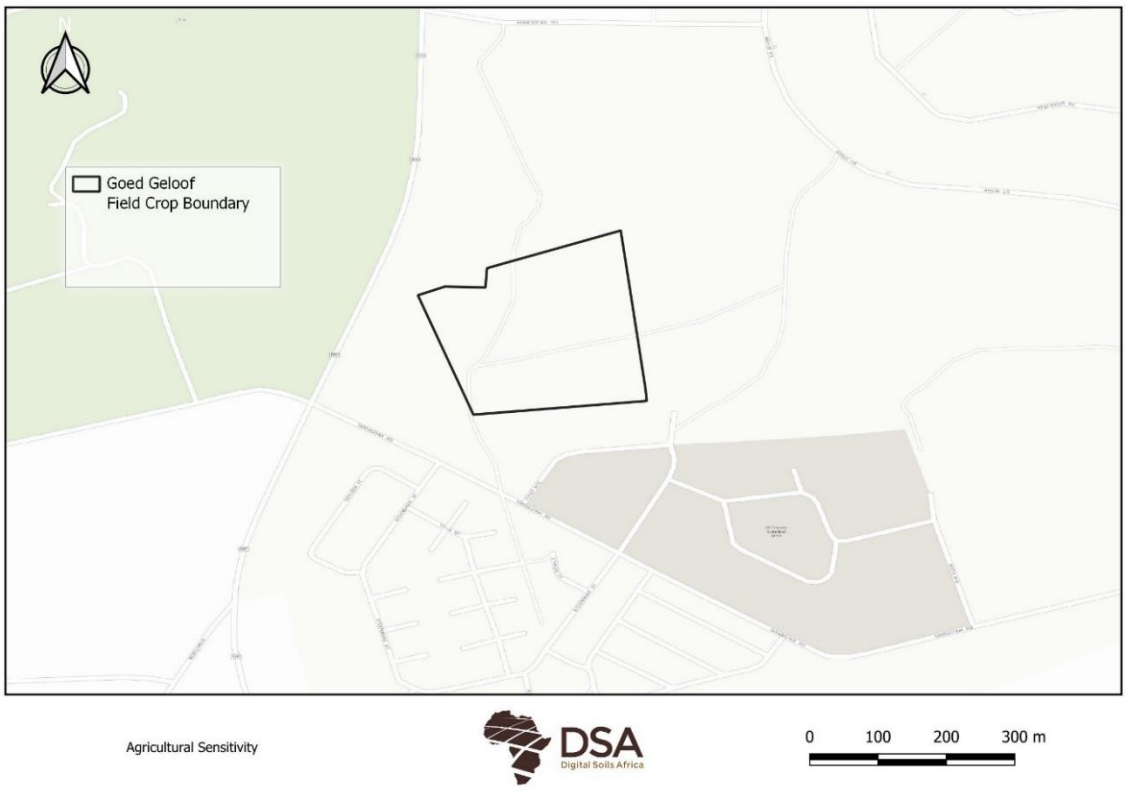


FIGURE 4: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL.

Preservation and Development of Agricultural Land Framework Act (PD-ALF) is in the process of being published. The new statutory framework will replace the Subdivision of Agricultural Land Act, Act 70 of 1970.

Protected Agricultural Area, as in the draft framework, is defined as *"an agricultural land use zone, protected for purposes of food production and ensuring that high potential and best available agricultural land are protected against non-agricultural land uses in order to promote long-term agricultural production and food security."*

The study area is not situated in a Protected Agricultural Area (Figure 5).

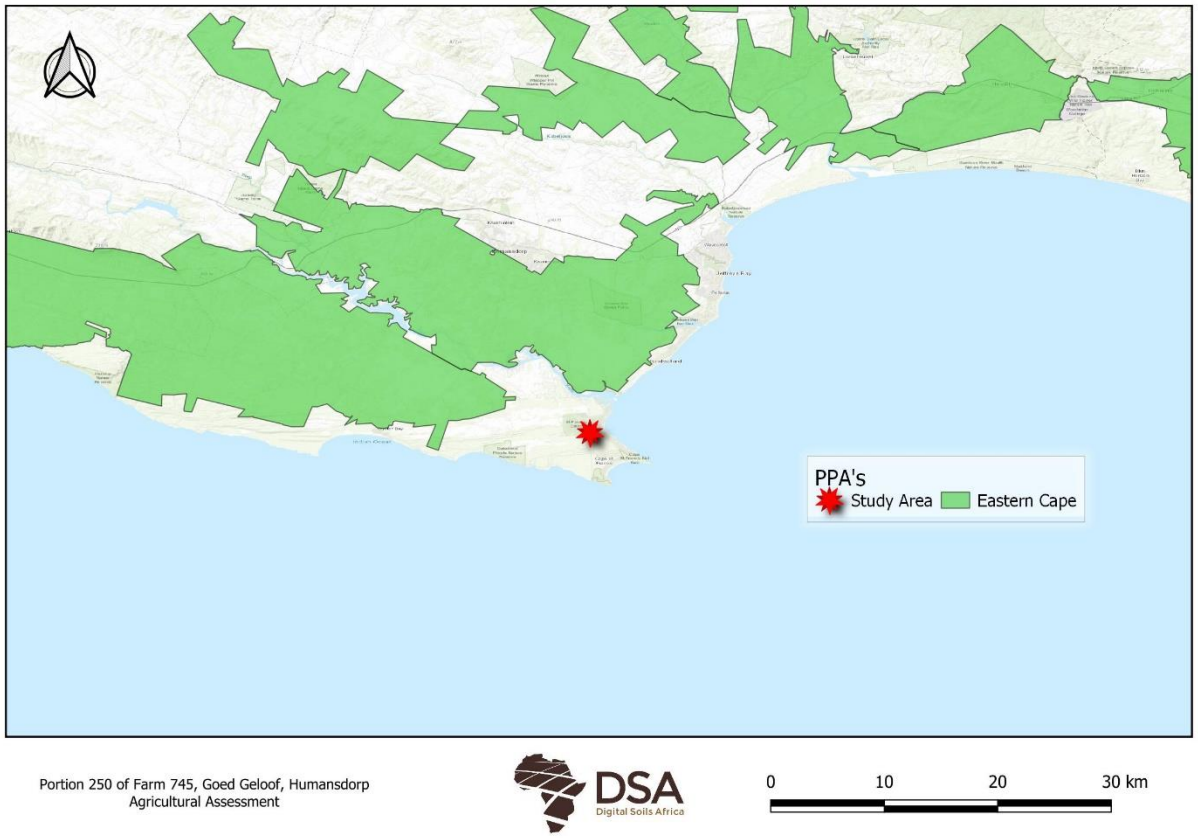


FIGURE 5: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

As per the protocol, Terms of Reference applicable to an "Agricultural Compliance Statement" is as follows:

- The compliance statement must be prepared by a soil scientist or agricultural specialist registered with the SACNASP. (**pg24**)
- The compliance statement must:
- be applicable to the preferred site and proposed development footprint **(pg5)**;
- confirm that the site is of "low" or "medium" sensitivity for agriculture**(pg23)**;

- indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site (pg23).
- The compliance statement must contain, as a minimum, the following information:
- contact 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 (pg24);
- 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 (pg5);
- confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities (pg23);
- a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development (23);
- any conditions to which the statement is subjected (pg23);
- in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase (not applicable).
- where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr (not applicable);
- and a description of the assumptions made and any uncertainties or gaps in knowledge or data (pg5).

RESULTS

CLIMATE CAPABILITY

The climate here is mild, and generally warm and temperate. The rainfall in Humansdorp is significant, with precipitation even during the driest month. The Köppen-Geiger climate classification identifies this particular weather pattern as belonging to the category of Cfb. The average temperature in Humansdorp is 16.9 °C. The rainfall here is around 579 mm per year. The site has a semi-arid climate (Figure 6).

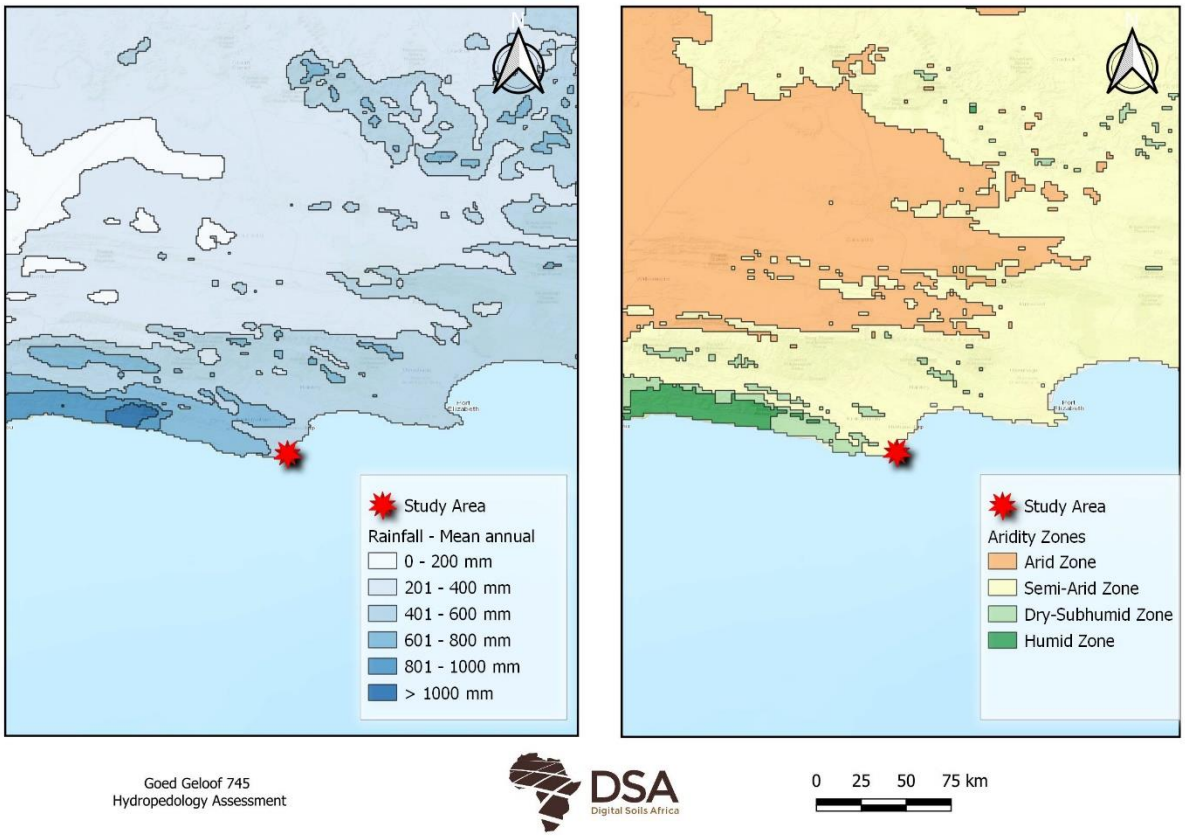


FIGURE 6: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

TABLE 1: CLIMATIC PROPERTIES OF HUMANSDORP (CLIMATE-DATA.ORG).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature	20.8 °C	21 °C	19.8 °C	17.6 °C	15.7 °C	13.7 °C	13.1 °C	13.5 °C	14.4 °C	16.2 °C	17.5 °C	19.5 °C
Min. Temperature	17.1 °C	17.4 °C	16.2 °C	13.9 °C	11.9 °C	9.6 °C	9.1 °C	9.5 °C	10.4 °C	12.3 °C	13.7 °C	15.7 °C
Max. Temperature	25 °C	25.3 °C	24.4 °C	22.3 °C	20.6 °C	18.6 °C	18.1 °C	18.5 °C	19.2 °C	20.7 °C	21.8 °C	23.7 °C
Rainfall mm	44	48	54	49	39	40	40	56	42	56	62	49
Humidity	73%	74%	74%	73%	70%	66%	66%	69%	71%	72%	71%	71%
Rainy days	7	6	6	6	5	5	5	6	6	6	7	7
avg. Sun hours	8.3	7.8	7.7	7.6	7.7	7.6	7.5	7.7	7.9	8.0	8.5	8.5

Climate capability is highest weighted factor (40%) in the calculation of the Land capability (DAFF, 2017) which is used in the Screening Tool to determine the agricultural sensitivity. Soil capability (30%) and Terrain capability (30%) contribute the remaining considerations. The climate capability consists of 9 values, with 1 being the lowest value and 9 being the highest value (There is however no evaluation value of 1 & 2).

The Climate capability determined by the following factors:

- Moisture supply capacity (50%)
- Physiological capacity (20%)
- Climatic constraints (30%)

The climate capability according to the Department of Agriculture, Forestry and Fisheries, 2017, is a value of 7 (Figure 7). This is considered a high climate capability.

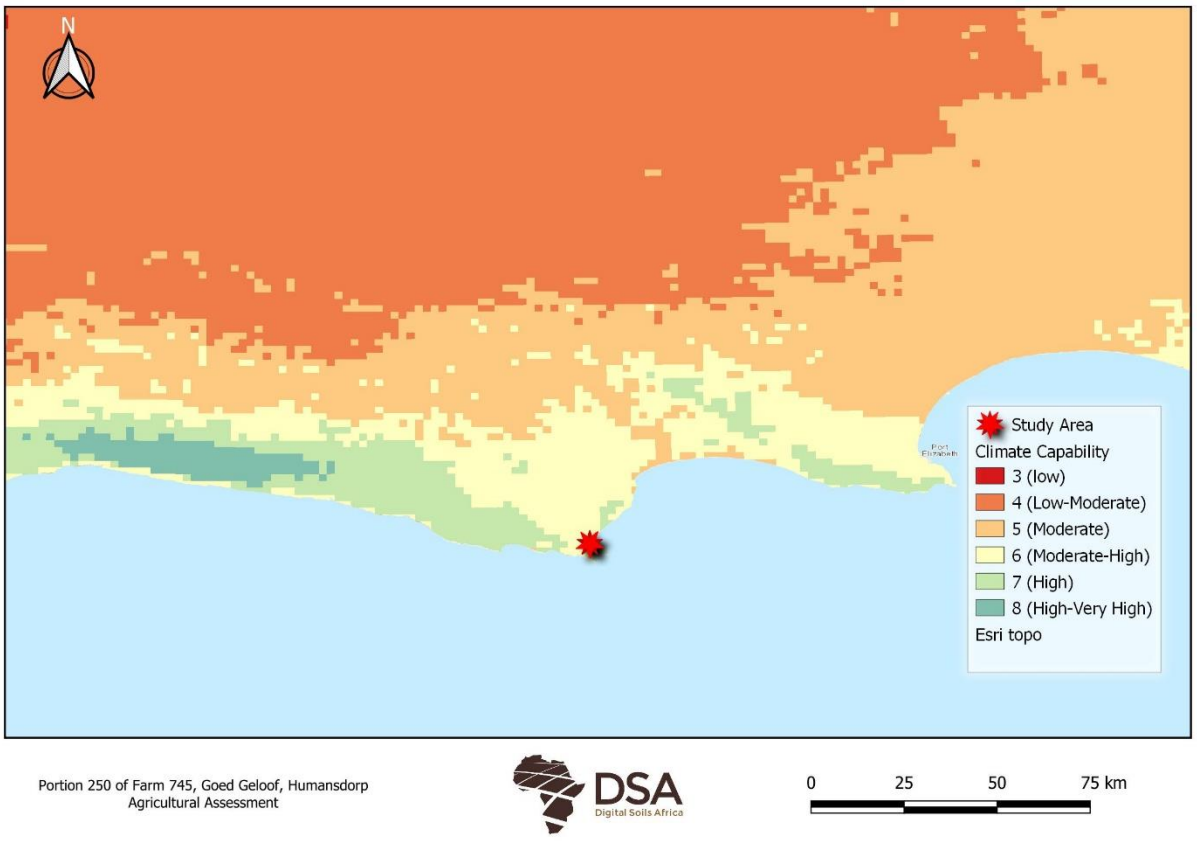


FIGURE 7: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

SOIL

LANDTYPE

A land type is an area which can be demarcated at a scale of 1:250 000 with similar soil forming factors and therefore soil distribution patterns. A land type does therefore not represent uniform soil polygons, but rather information regarding the occurrence of different soils on different terrain units can be obtained from the land type inventory. Landtype data was used in calculating the soil capability (DAFF, 2017), and therefore, indirectly used in the Screening tool for estimating the agricultural sensitivity.

The study area is comprised of the Ha land type (Land Type Survey Staff, 1972 – 2002) (Figure 8). Ha land type consists of deep grey sandy soils (comprise >80% of land type).

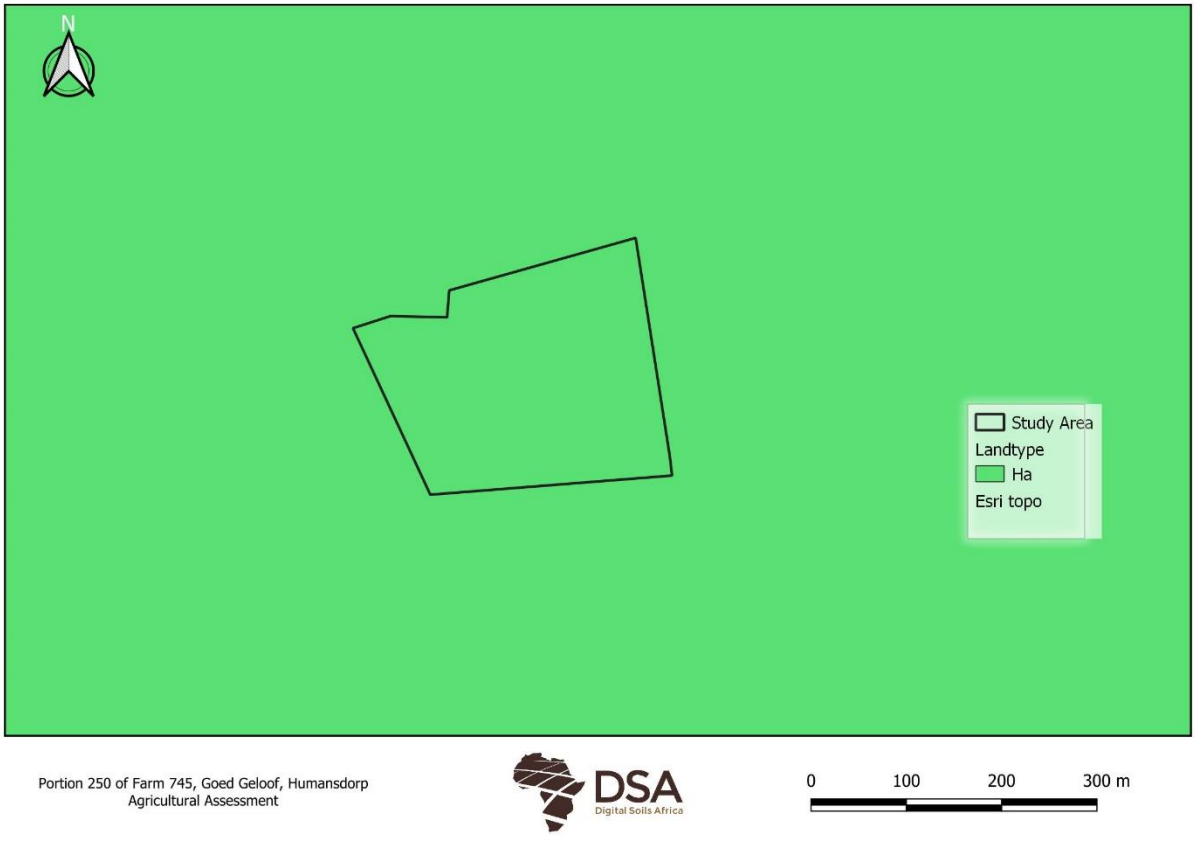


FIGURE 8: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

SOIL CAPABILITY

The Soil capability consists of 9 values, with 1 being the lowest value and 9 being the highest value. The main factors contributing to the Soil capability consist of:

- Plan available water (80%)
- Soil sensitivity (17%)
- Soil fertility (3%)

The soil capability according to the DAFF (2017), is 6 (Figure 9). This is considered a Moderate to High soil capability.

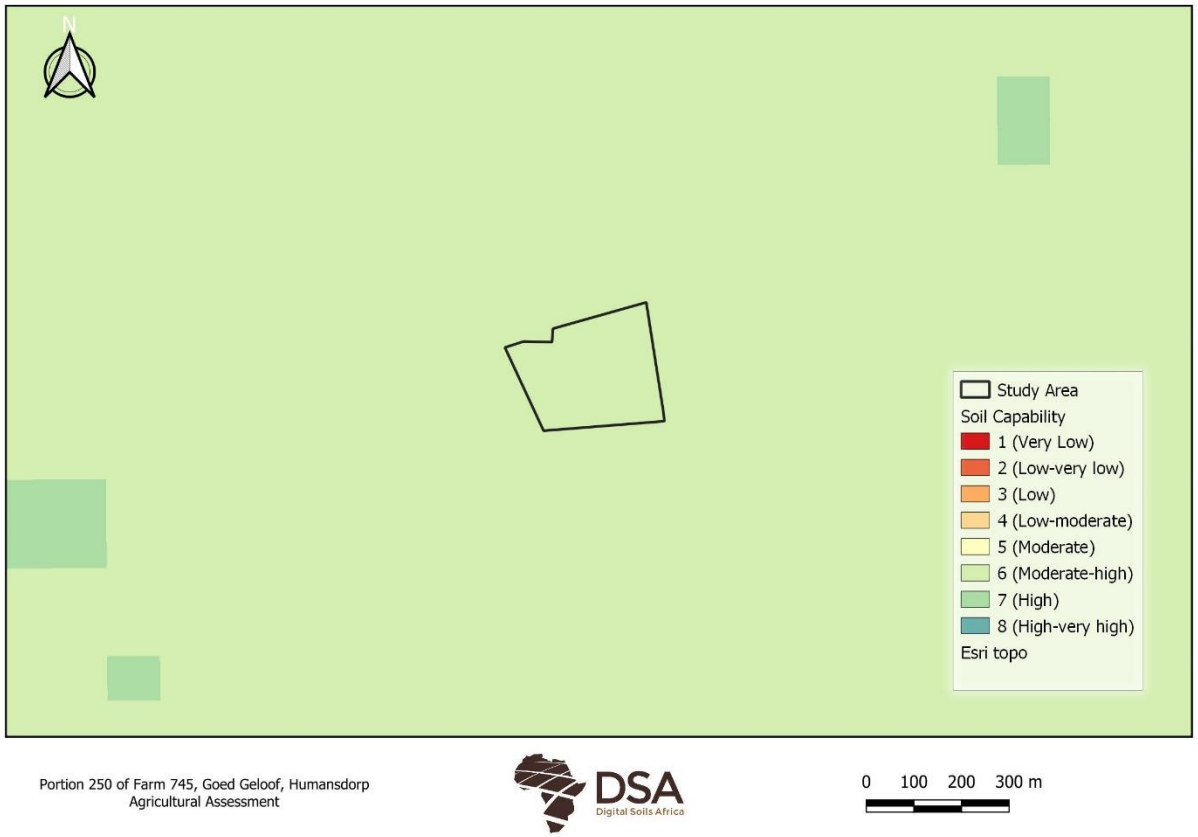


FIGURE 9: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

TERRAIN CAPABILITY

Terrain plays an important role in a plants' physiological growth requirements, and from a sensitivity and accessibility perspective, Therefore, the two terrain modelling concerns included in the terrain capability modelling exercise were plant physiology and terrain sensitivity. The Terrain capability consists of 9 values, with 1 being the lowest value and 9 being the highest value.

The terrain capability according to the DAFF (2017), is a value of 5 to 6. This is considered a moderate to high terrain capability.

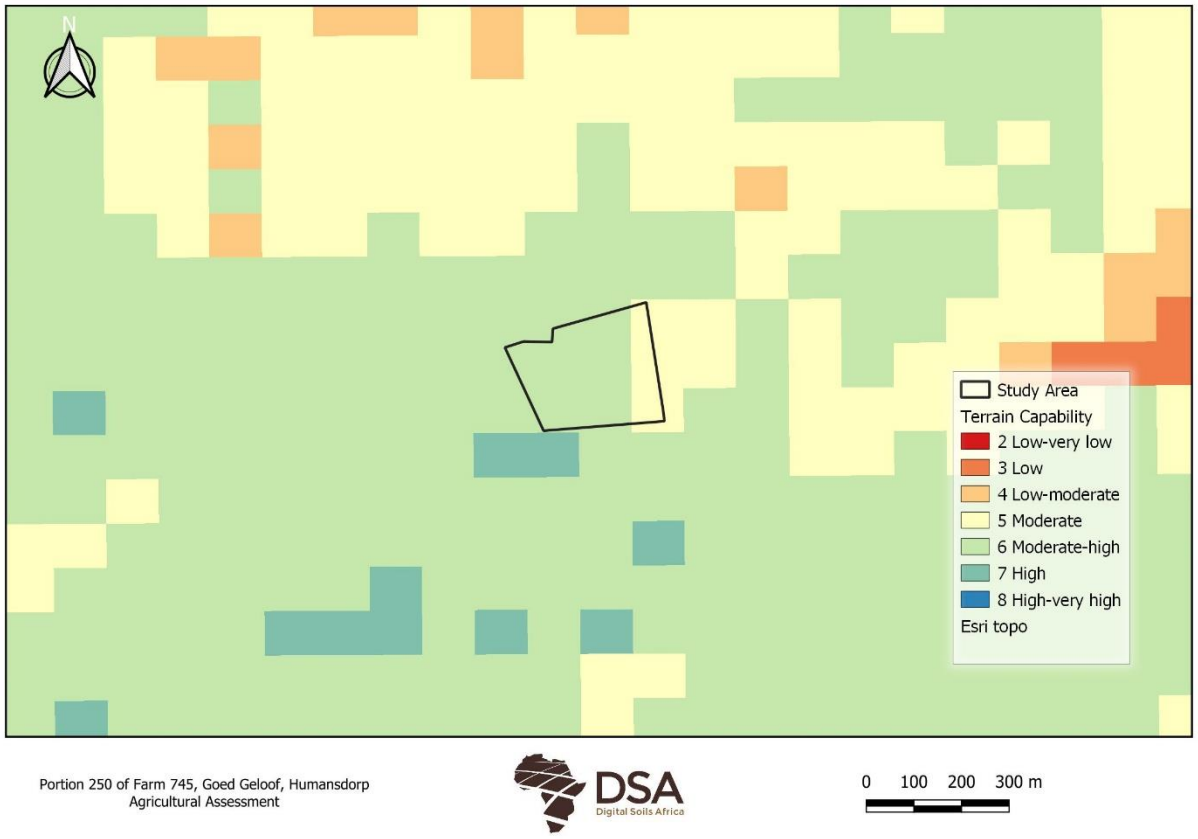


FIGURE 10: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

LAND CAPABILITY

The new Land capability (Department of Agriculture, Forestry and Fisheries, 2017) has fifteen classes, as opposed to the eight classes described by Schoeman et al. (2002). The data is usable on a scale of 1:50 000 – 1: 100 000, therefore, not suitable for farm scale recommendations. Classes 1 to 7 are of low land capability and only suitable for wilderness or grazing. Classes 8 to 15 are considered to have arable land capability with the potential for high yields increasing with the land capability class number.

TABLE 2: LAND CAPABILITY CLASS AND THE DESCRIPTION OF THE CLASS

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

The Land capability values of between 10 to 11, which classifies as highly arable soils (Figure 11).

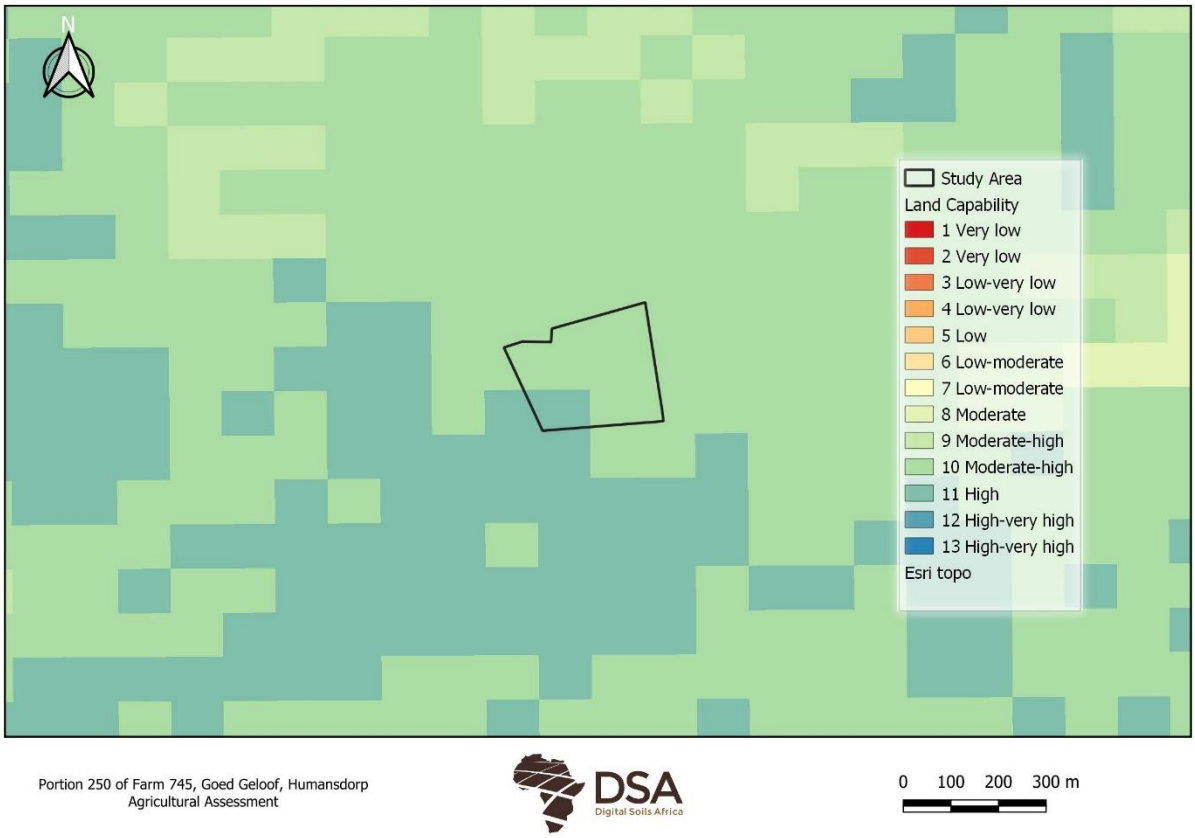


FIGURE 11: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). The site has a very high grazing capacity of 6 ha/LSU (Figure 12). A homogeneous unit of vegetation expressed as the area of land required (in hectares) to maintain a single animal unit (LSU) over an extended number of years without deterioration to vegetation or soil. Where an LSU = An animal with a mass of 450 kg and which gains 0.5 kg per day on forage with a digestible energy of 55%. (Trollope et. Al., 1990).

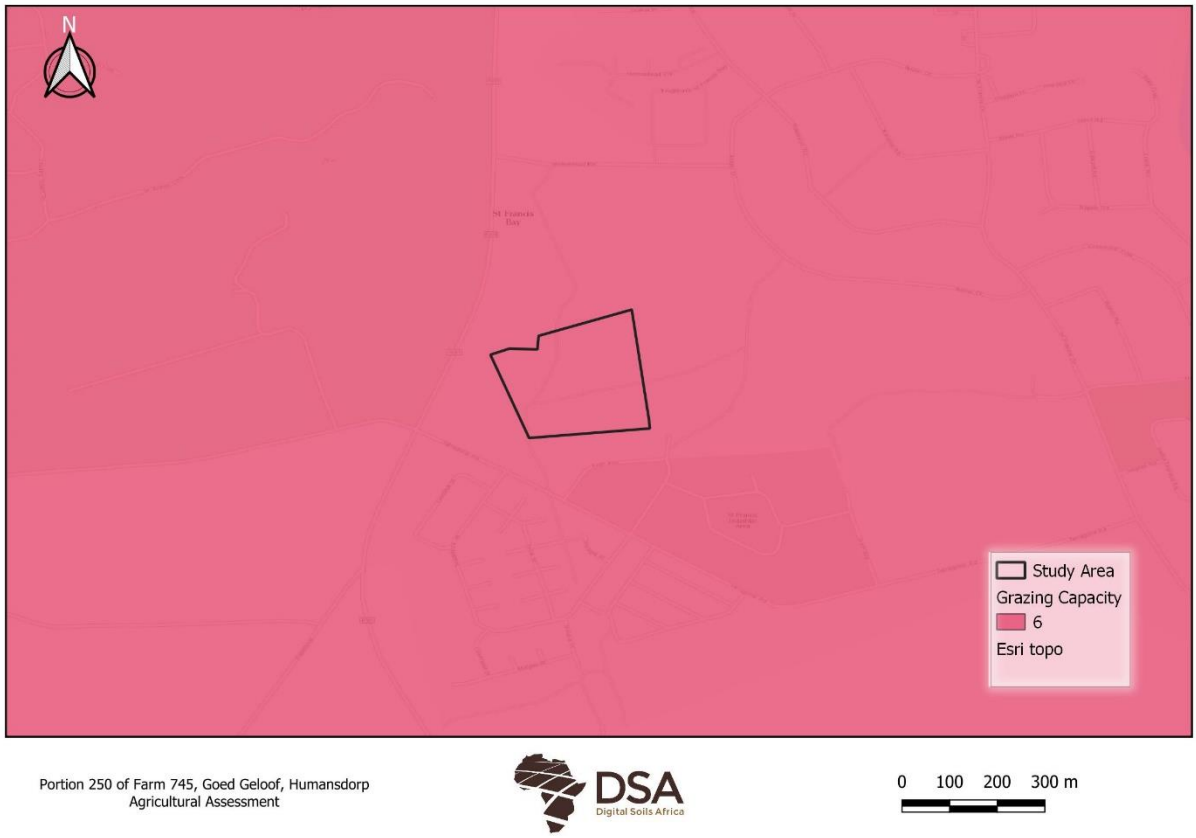


FIGURE 12: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

LAND USE

South African National Land-Cover 2020 (SANLC 2020) (GeoTerraImage, 2020) was compared to the 2014 Land Cover to determine if there was a land use change since 2014, and there was conflicting classification in the study area. The 2014 land use had lands in a section of the study area. SANLC 2020 classifies the area as forest (2 & 3), grassland and a small amount of industrial, while the 2014 has the area classified as forest (2 & 3) with a small amount of Namo Karoo shrubland.

TABLE 3: LEGEND TO FIGURE 13

No.	Class Name	Class Definition
2	Contiguous Low Forest & Thicket	Natural tall woody vegetation communities, with 75% or more canopy cover, and canopy heights exceeding 6 metres. Typically representative of tall, indigenous forests.
3	Dense Forest & Woodland	Natural tall woody vegetation communities, with canopy cover ranging between 35 - 75%, and canopy heights exceeding 2.5 metres. Typically represented by dense bush, dense woodland and thicket communities.
13	Natural Grassland	Natural and/or semi-natural indigenous grasslands, typically devoid of any significant tree or bush cover, and where the grassland component is typically dominant over any adjacent bare ground exposure. Typically representative of low, grass-dominated vegetation communities in the Grassland and Savanna Biomes.
66	Industrial	Built-up areas primarily containing formally planned and constructed industrial structures and associated utilities. Includes both light and heavy industry, power generation, airports, rail terminals and ports. In the agricultural sector this class also represents (chicken and pig) animal batteries, greenhouses and tunnels and intensive feedlots.

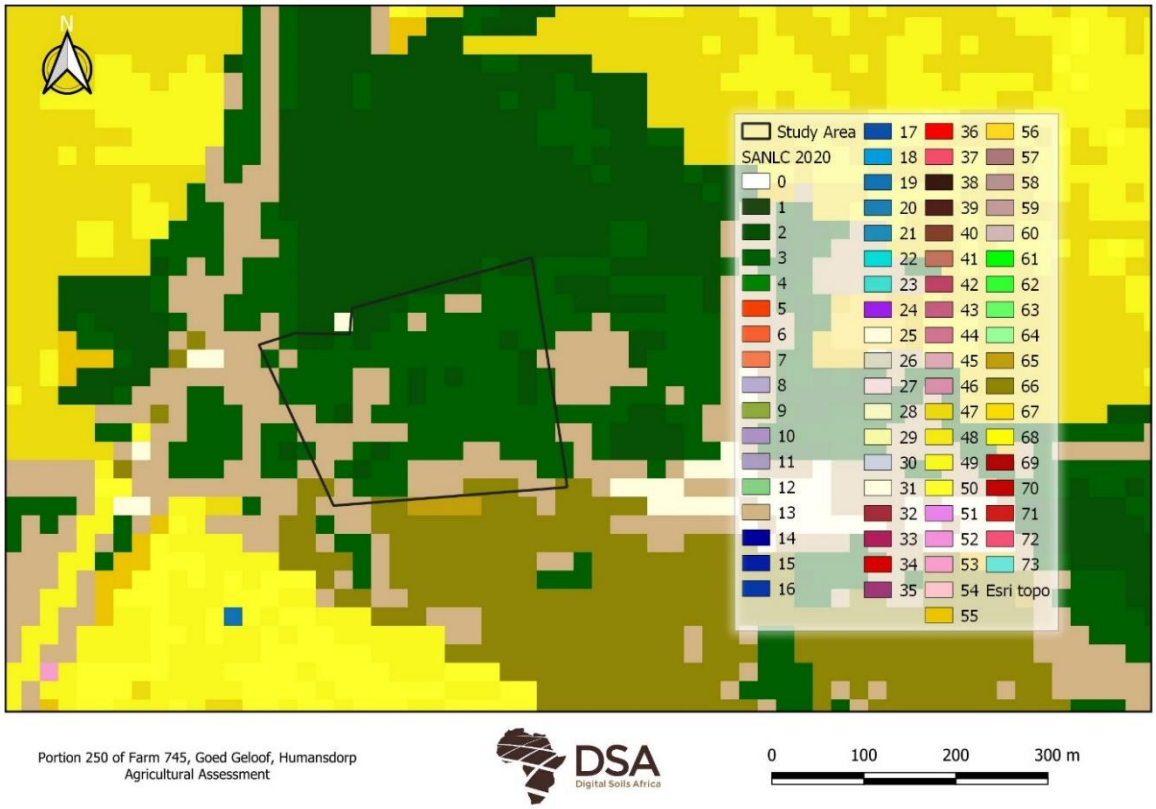


FIGURE 13: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020).

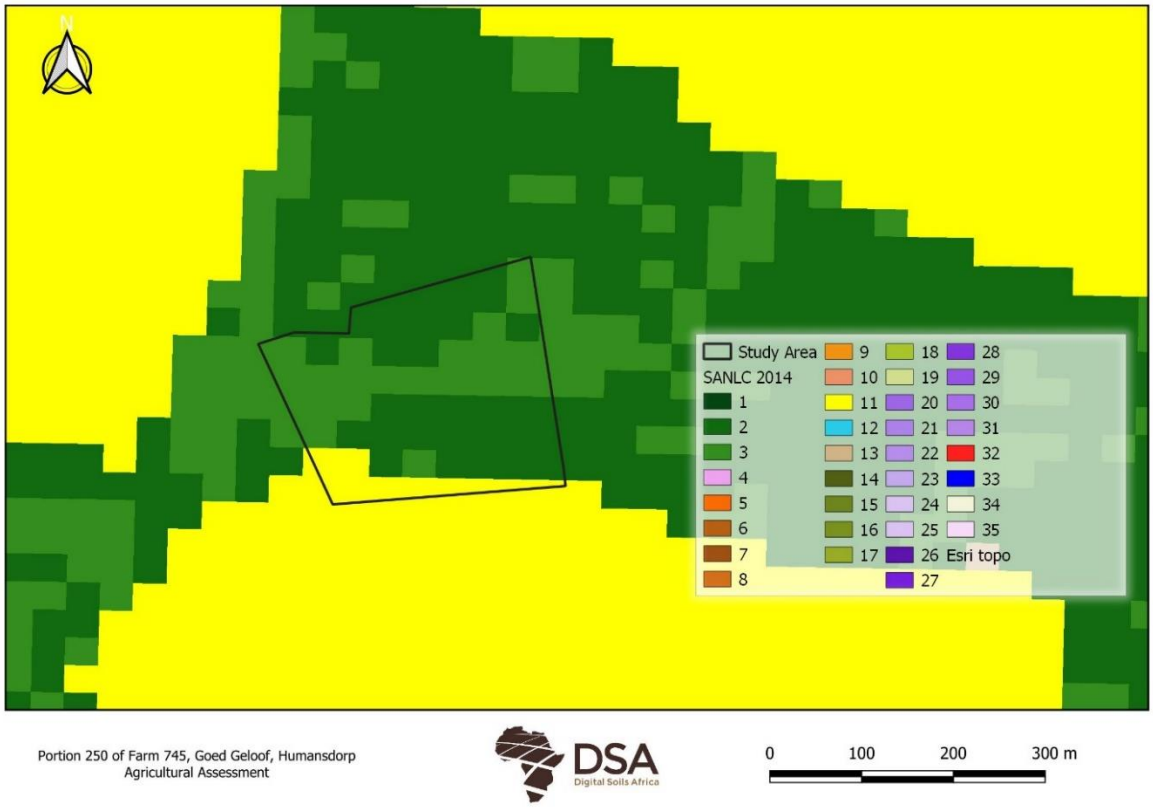


FIGURE 14: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014).

SITE VERIFICATION

LAND USE

The verification of the land use within the study area confirms the existence of a forest, though a larger extent has been cleared compared to what the South African National Land Cover (SANLC) database indicated. Additionally, we observed emergence of development within the SANLC data for the year 2020. Wetland vegetation was also noted in the study area. Illegal dumping in three distinct locations was observed, as well as evidence of small-scale sand mining. There is minimal indication of agricultural activities on the property.

The two dominant land covers are a dense shrub and cleared areas.

Wetland vegitation was observed between the shurbs.

Evidence of sand mining and illegal waste dumping was also found on the site.

FIGURE 15: LAND USE OF THE STUDY AREA.

LAND CAPABILITY

The verification of the soil distribution within the study area suggests a relatively uniform pattern, with sandy soils predominating across the entire property, except within the wetland regions. These sandy soils have been classified as Fernwood soils, characterized by low water holding capacity and typically associated with acidic pH levels. While these soils can be cultivated, they present notable limitations and require intensive management. Consequently, the initially projected high soil capability, as indicated in the screening tool, is found to be inaccurate and is updated to a moderate soil capability. The favourable climate conditions further support the viability of cultivating specific crops, leading to the assignment of a moderate land capability for the study area.

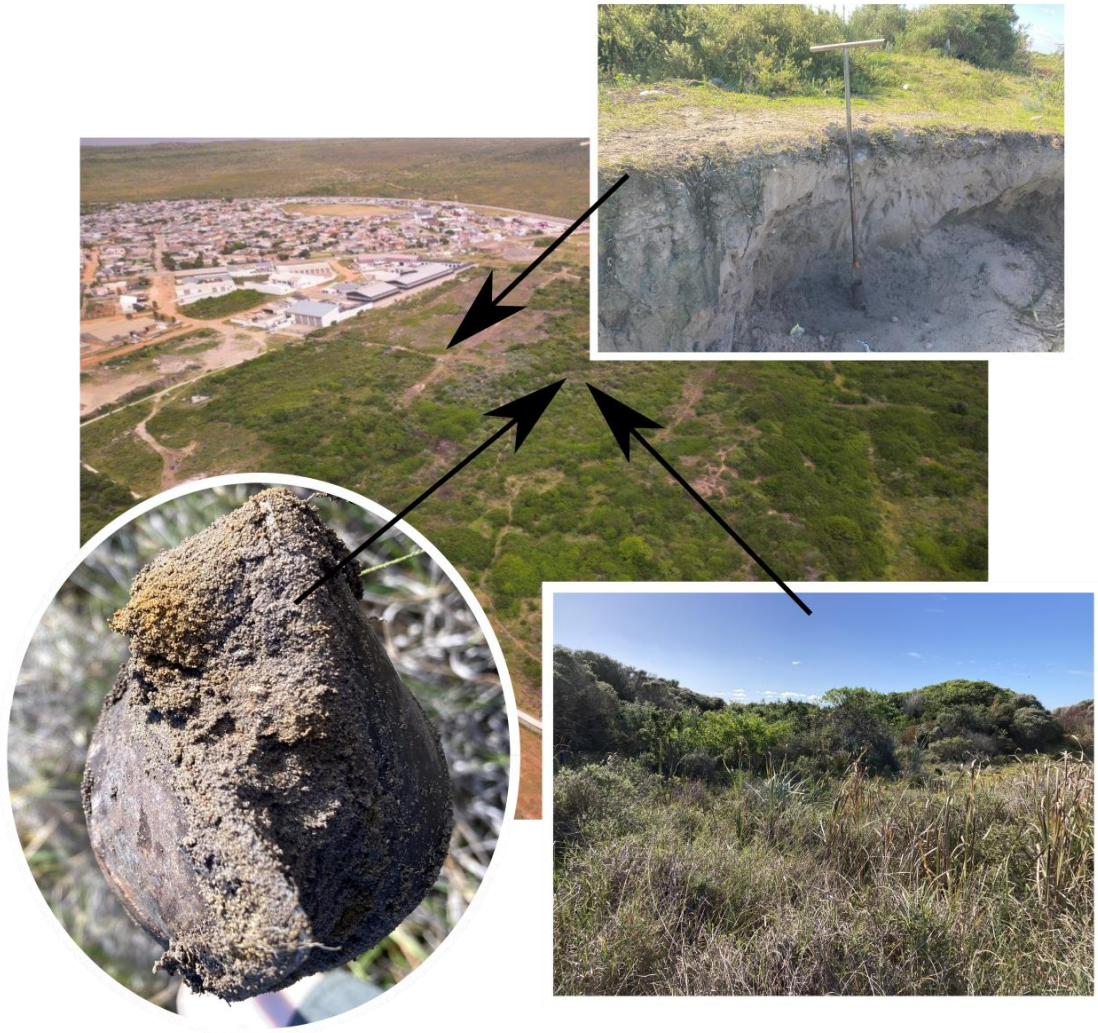


FIGURE 16: SOIL PROPEORTEIES OF THE STUDY AREA.

COMPLIANCE STATEMENT

According to the National Web-based Environmental Screening Tool, the site exhibits a very high agricultural sensitivity, primarily due to its land capability rating exceeding 11. However, it's important to note that there are no cultivated fields on the property, indicating underutilization of its agricultural potential.

Furthermore, the analysis of climate capability, soil capability, and terrain capability, as per the Department of Agriculture, Forestry, and Fisheries, has revealed favorable conditions for certain agricultural activities. The site boasts a high climate capability, a moderate to high soil capability, and a moderate to high terrain capability, which collectively suggest a suitable environment for various agricultural produce.

Notably, the revised land capability classification introduced by the Department of Agriculture, Forestry, and Fisheries in 2017, with its fifteen classes, provides a more detailed assessment compared to the previous eight-class system. This updated classification places the study area within the range of highly arable soils, particularly those with land capability values between 10 and 11, indicating significant agricultural potential.

However, a comparison between the South African National Land-Cover data for 2014 and 2020 revealed conflicting classifications, with indications of land use changes and development within the study area. Lastly, our examination of soil distribution within the study area underscores the predominance of sandy Fernwood soils with low water retention capacity and acidic pH levels. While these soils can be cultivated, they demand intensive management due to their limitations.

In summary, the study area exhibits agricultural potential, particularly for arable crops, but successful cultivation would be limited to certain crops and high management inputs. Therefore, a medium sensitivity is proposed.

Due to the small footprint and low impact on existing agricultural activities, it is the specialist's opinion that the development continues. The development will not have a significant impact on agricultural in the area and poses no threat to food security. In terms of agricultural sensitivity, the development should thus be allowed to proceed.

APPENDIX 1: SPECIALIST CV

DR DARREN BOUWER

EDUCATION

PhD Soil Science	University of the Free State	2018
M.Sc. Soil Science	University of the Free State	2013
B.Sc. Soil Science (Hon)	University of the Free State	2009
B.Sc. Soil Science	University of the Free State	2008
Matric certificate	Queens College	2005

PROFESSIONAL AFFILIATIONS

- SACNASP- Pri Nat Sci 400081/16
- Member of the Soil Science Society of South Africa
- Member of the Soil Classification Work Group
- Member of South African Soil Surveyors Organisation

WORK EXPERIENCE

- **Digital Soils Africa** / Soil Scientist - May 2012 – Present
- **Ghent University** / Researcher- January 2016 - December 2016
- **University of the Free State**/ Assistant Researcher- January 2011- December 2015

PUBLICATIONS

Total consultancy reports: >120 **Total Publications: 5**

Most relevant:

Bouwer, D., Le Roux, P. A., van Tol, J. J., & van Huyssteen, C. W. (2015). Using ancient and recent soil properties to design a conceptual hydrological response model. Geoderma, 241, 1–11.

Van Zijl, G. M., Bouwer, D., van Tol, J. J., & le Roux, P.A.L. (2014). Functional digital soil mapping: A case study from Namarroi, Mozambique. Geoderma, 219-220, 155–161.

SPECIALIST DECLARATION

I, Darren Bouwer, declare that –

- I act as the independent specialist in this application;
- I regard the information contained in this report to be true and correct;
- I do not have a conflict of interest in this project;
- I will conduct the work relating to the project in an objective manner.

Dr Darren Bouwer
PhD Soil Science
Pri Nat Sci 400081/16