COMPLAINCE STATMENT FOR PORTION 91 OF FARM 304, MATJESFONTEIN, PLETTENBERG BAY

PREPARED FOR

ECO ROUTE

MAY 2023

DSA
Digital Soils Africa

+27 83 703 3002

www.dsafrica.co.za

darren@dsafrica.co.za

Kemsley Street

Port Elizabeth

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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 91 of Farm 304, Matjesfontein, Plettenberg Bay, in the Western Cape Province. According to an affidavit of Mr D Steele, the potatoes and sweet potatoes were cultivated on the lands during the 1960's. Thereafter, it was used as pastures for cattle.

The development concept includes ± 73 group housing stands with average erf sizes of ±375m². The houses will vary in size but will be built in a similar style that will create a harmonious development. Ample open spaces and landscaped streets are incorporated into the design to enhance the quality of the neighbourhood.

FIGURE 1: LOCATION OF THE STUDY AREA IN THE GAUTENG PROVINCE.

ENVIRONMENTAL SCREENING TOOL

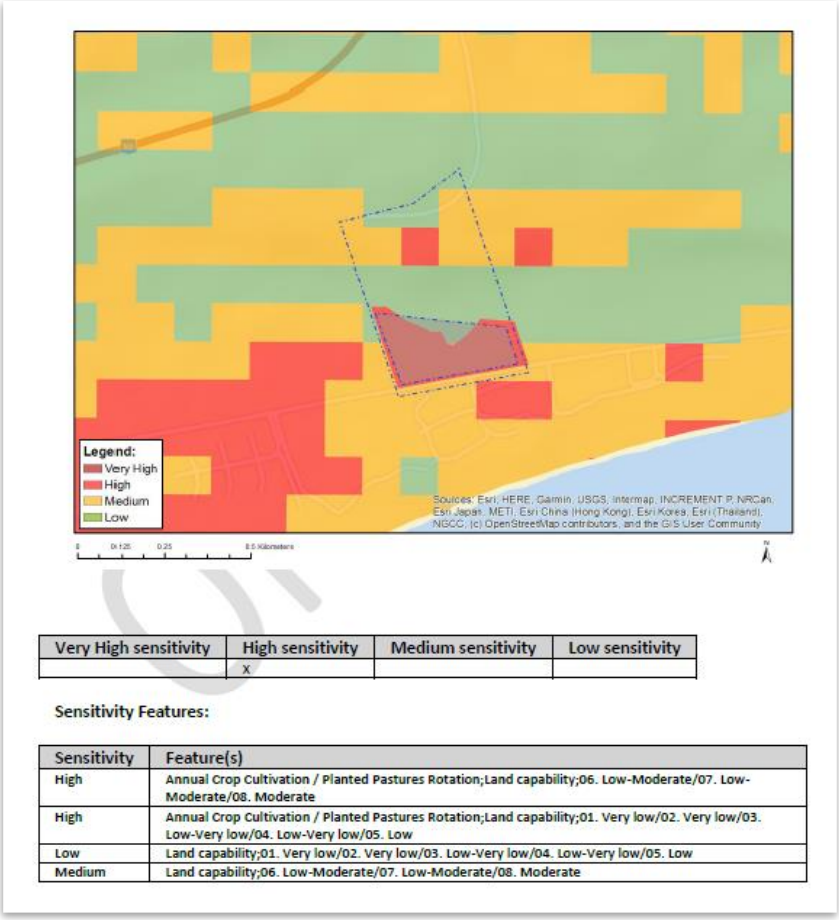
Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

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 high agricultural sensitivity (Figure 2), this is due to the land use being annual cultivated pastures (Figure 3). The land capability (DAFF, 2017) classifies the soils as having a land capability of low and medium (Figure 4).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

FIGURE 2: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL.

FIGURE 3: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL.

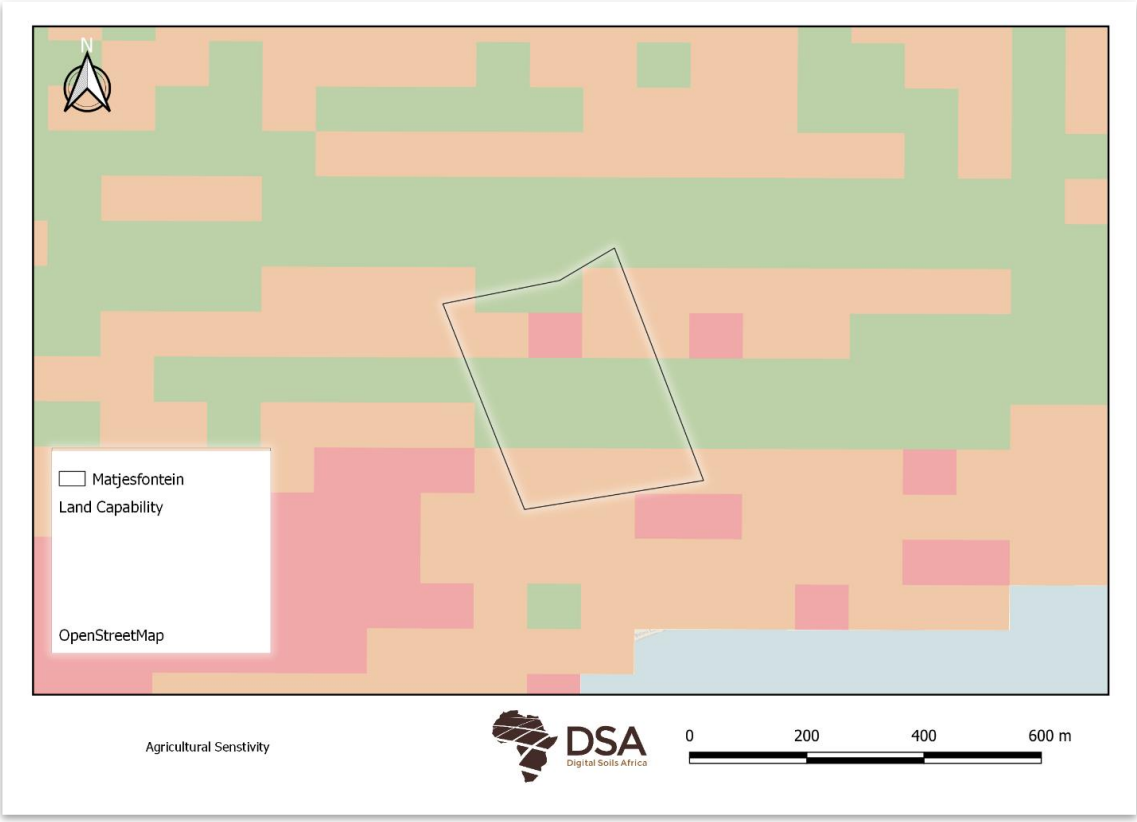


FIGURE 4:THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL.

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).

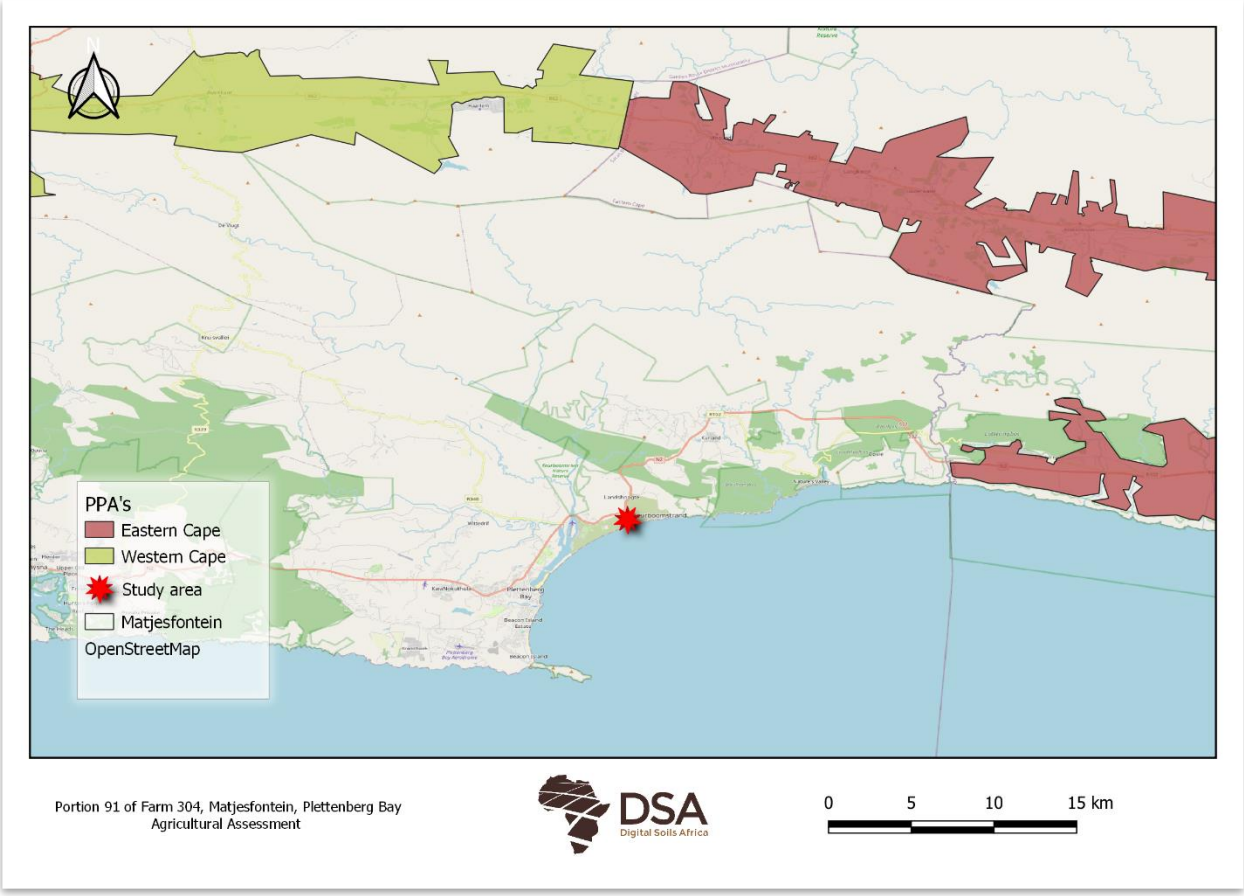


FIGURE 5: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

RESULTS

CLIMATE CAPABILITY

The climate is warm and temperate. The Köppen-Geiger climate classification is Cfb, which is considered wet all seasons, summers long and cool. The average annual temperature is 16.9 °C. Rainfall is evenly distributed throughout the year, with an annual precipitation of about 663 mm. The site has a humid climate (Figure 6). Therefore, cultivation of dry land crops will be possible, and the suitable soils could produce high yields.

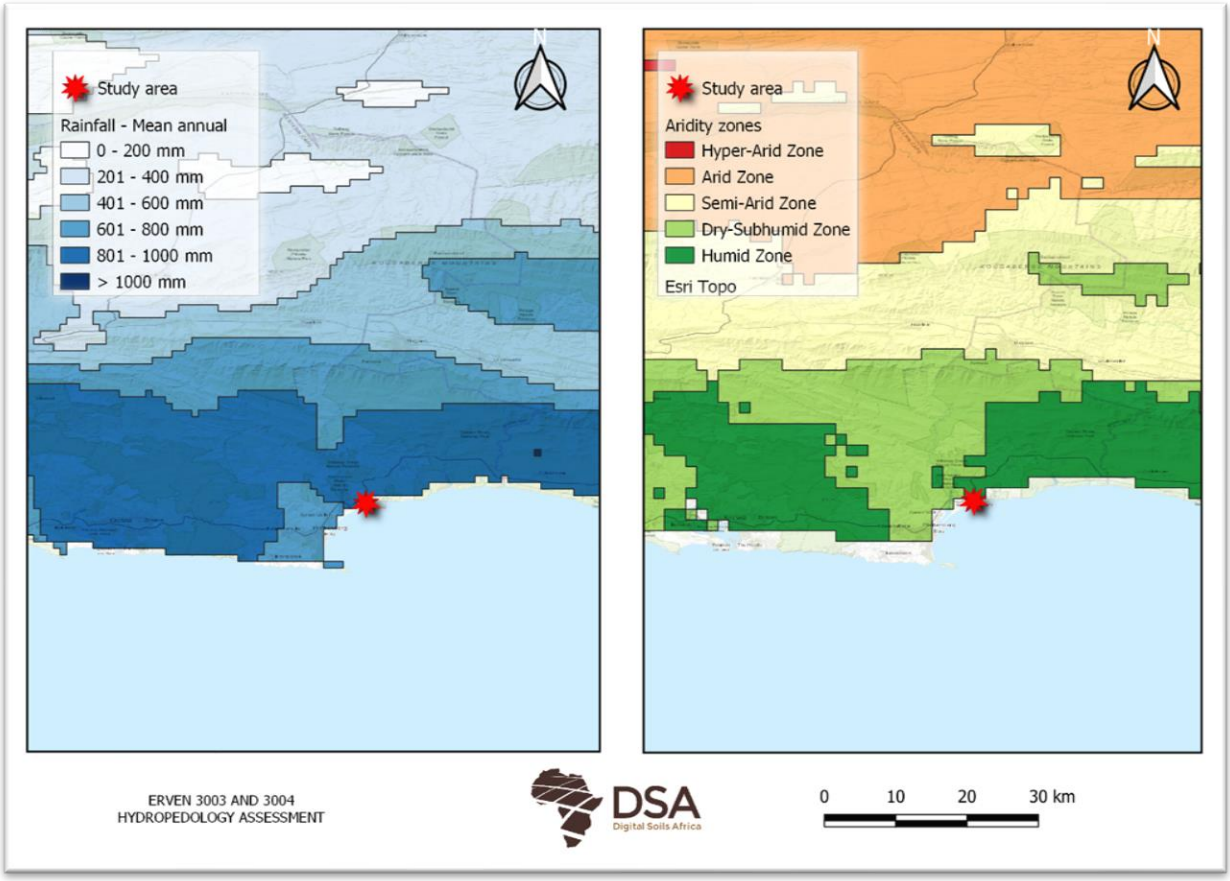


FIGURE 6: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

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

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature	20.2 °C	20.5 °C	19.5 °C	17.7 °C	16.1 °C	14.2 °C	13.7 °C	14 °C	14.6 °C	16.2 °C	17.2 °C	19 °C
Min. Temperature	17.1 °C	17.4 °C	16.4 °C	14.5 °C	12.8 °C	10.7 °C	10.3 °C	10.5 °C	11.2 °C	12.8 °C	14 °C	15.9 °C
Max. Temperature	23.4 °C	23.7 °C	22.9 °C	21.3 °C	19.9 °C	18.2 °C	17.7 °C	17.9 °C	18.4 °C	19.6 °C	20.5 °C	22.3 °C
Rainfall mm	52	47	56	55	48	48	50	66	53	65	71	52
Humidity	77%	78%	77%	75%	71%	68%	68%	70%	72%	75%	75%	76%
Rainy days	7	6	7	6	5	6	6	7	7	7	7	7
avg. Sun hours	8.8	8.3	7.9	7.8	7.7	7.5	7.5	7.8	7.9	8.3	8.8	9.1

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.

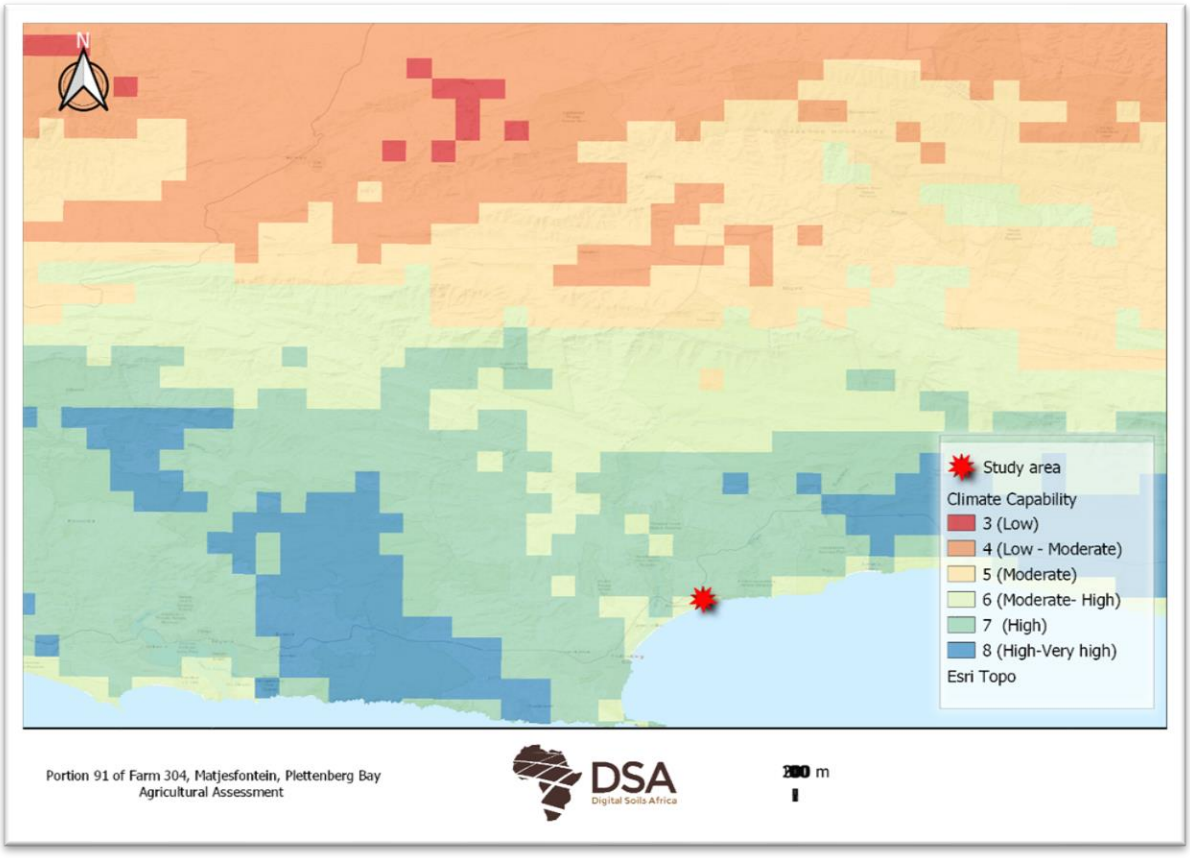


FIGURE 7: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 Hb and Fa land types (Land Type Survey Staff, 1972 – 2002) (Figure 8). Hb landtypes comprise of sandy soils and deep grey sands are sub dominant (comprise >20% of land type). Land type Fa consists of shallow soils (Mispah & Glenrosa forms) with little or no lime in landscape.

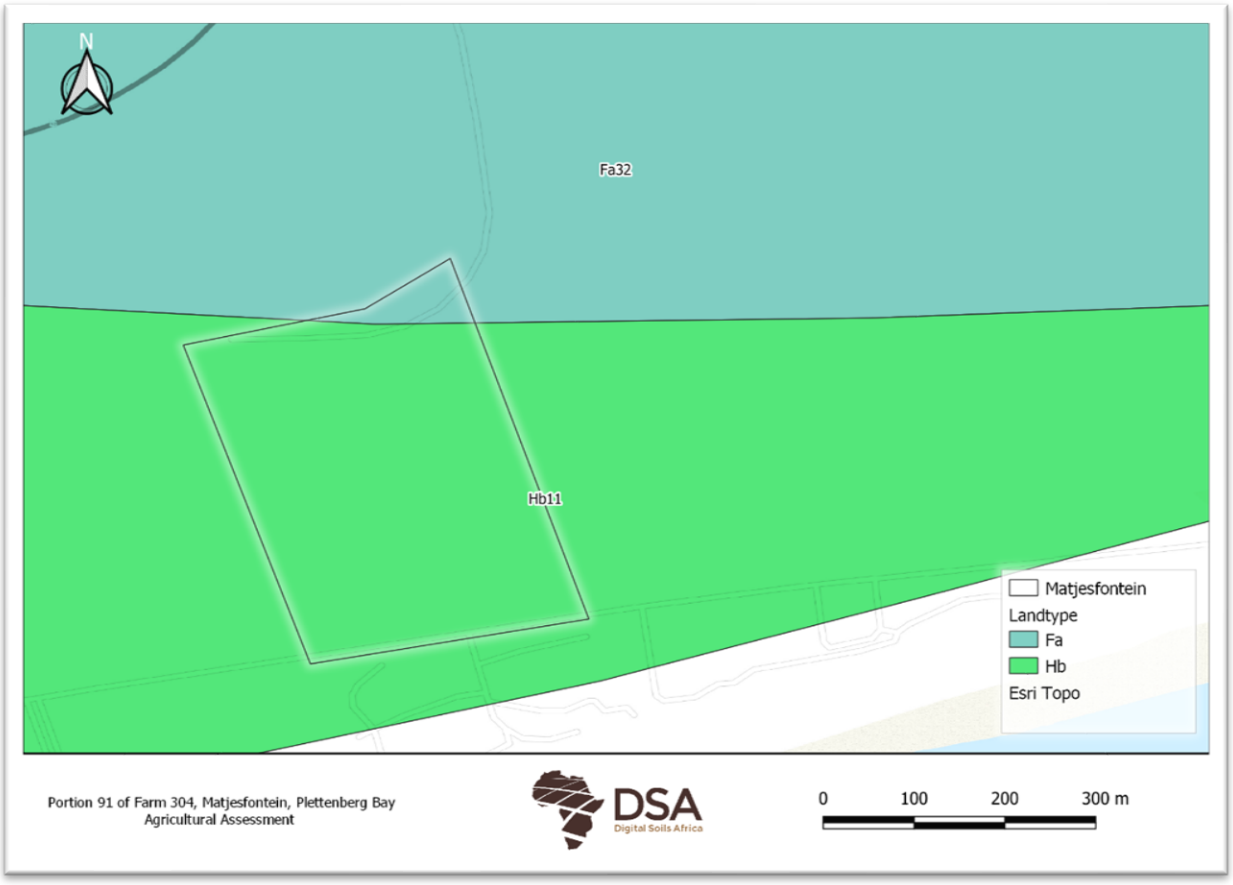


FIGURE 8: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

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), ranges from a value of 4 to 7 (Figure 9). This is considered a Low- moderate to High soil capability.

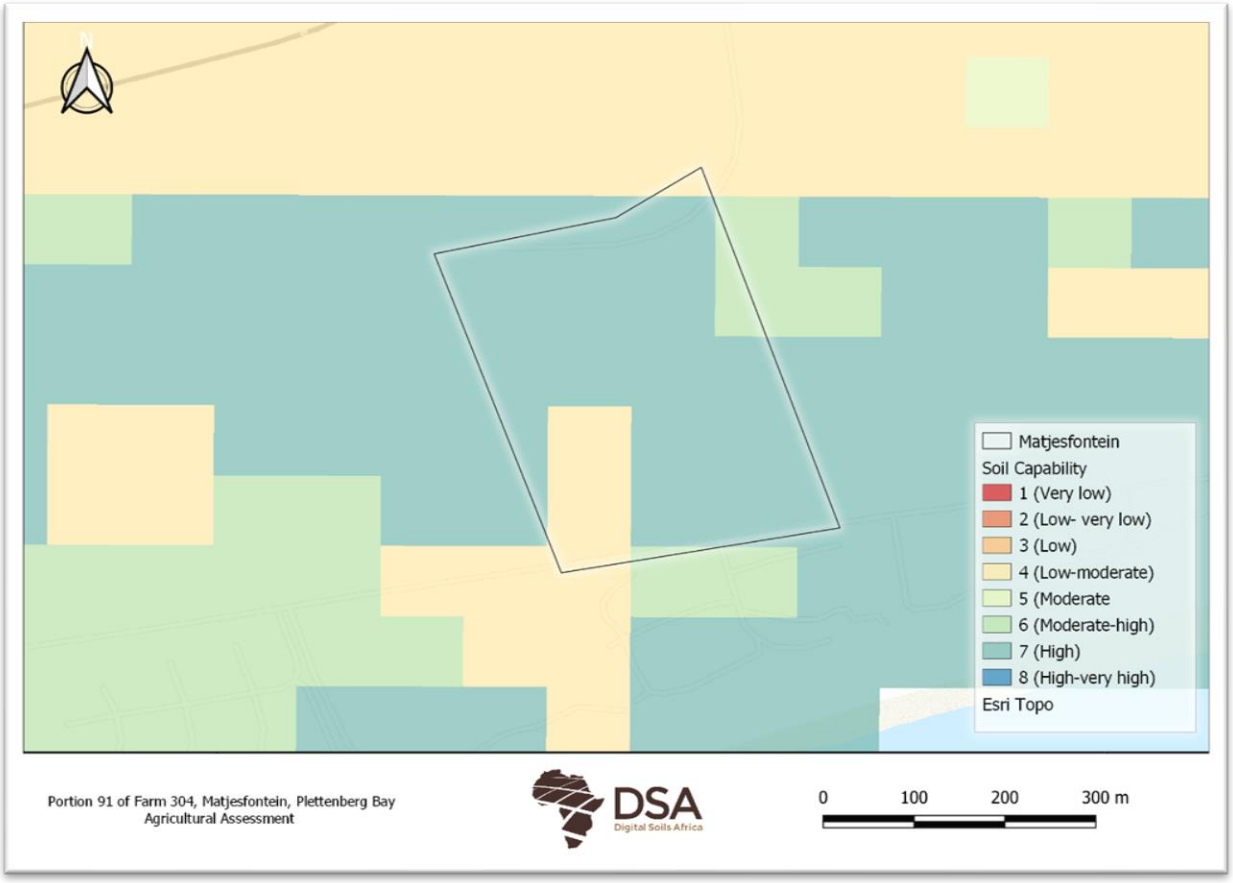


FIGURE 9: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 3 to 5. This is considered a low to moderate terrain capability.

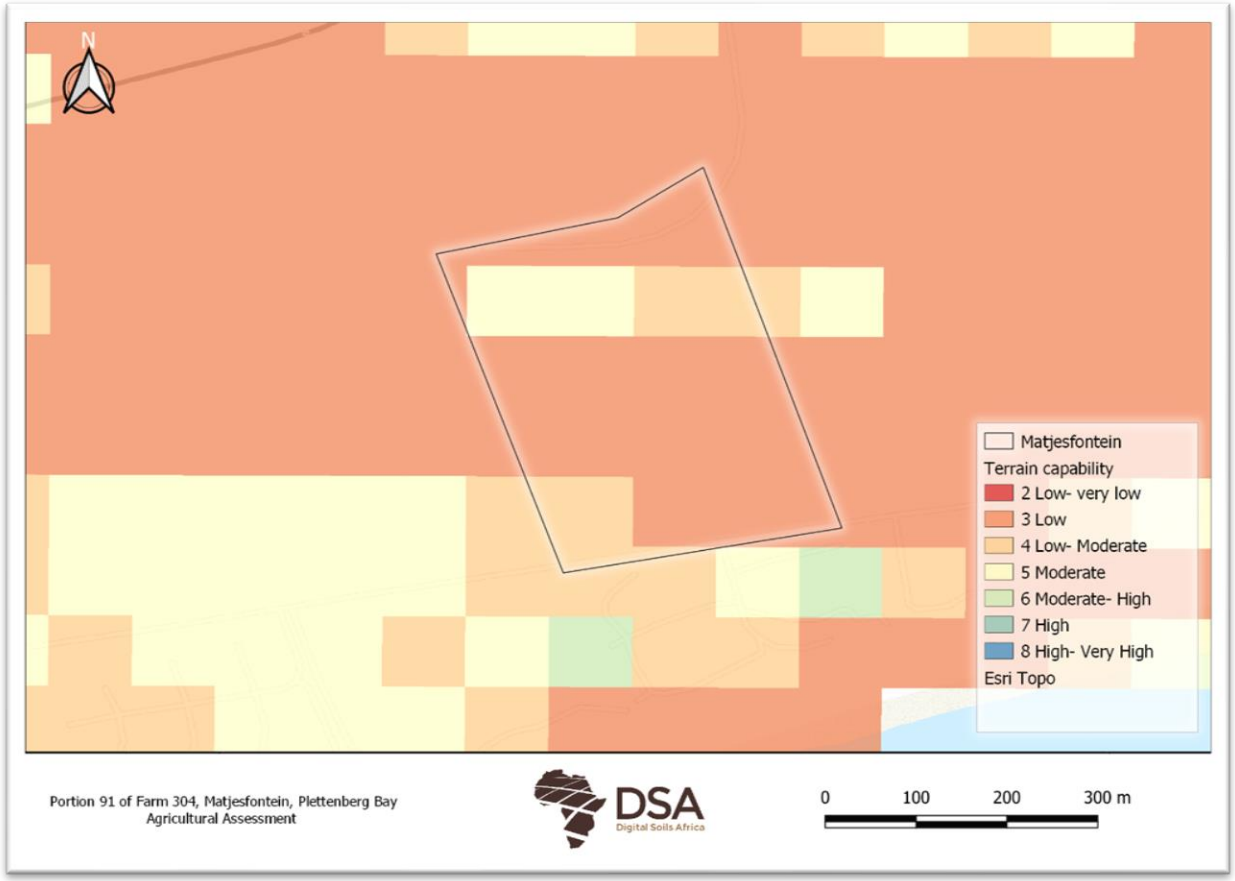


FIGURE 10: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 4 and 9, which range from not arable soils (1-7) and moderately arable (8-9) (Figure 11).

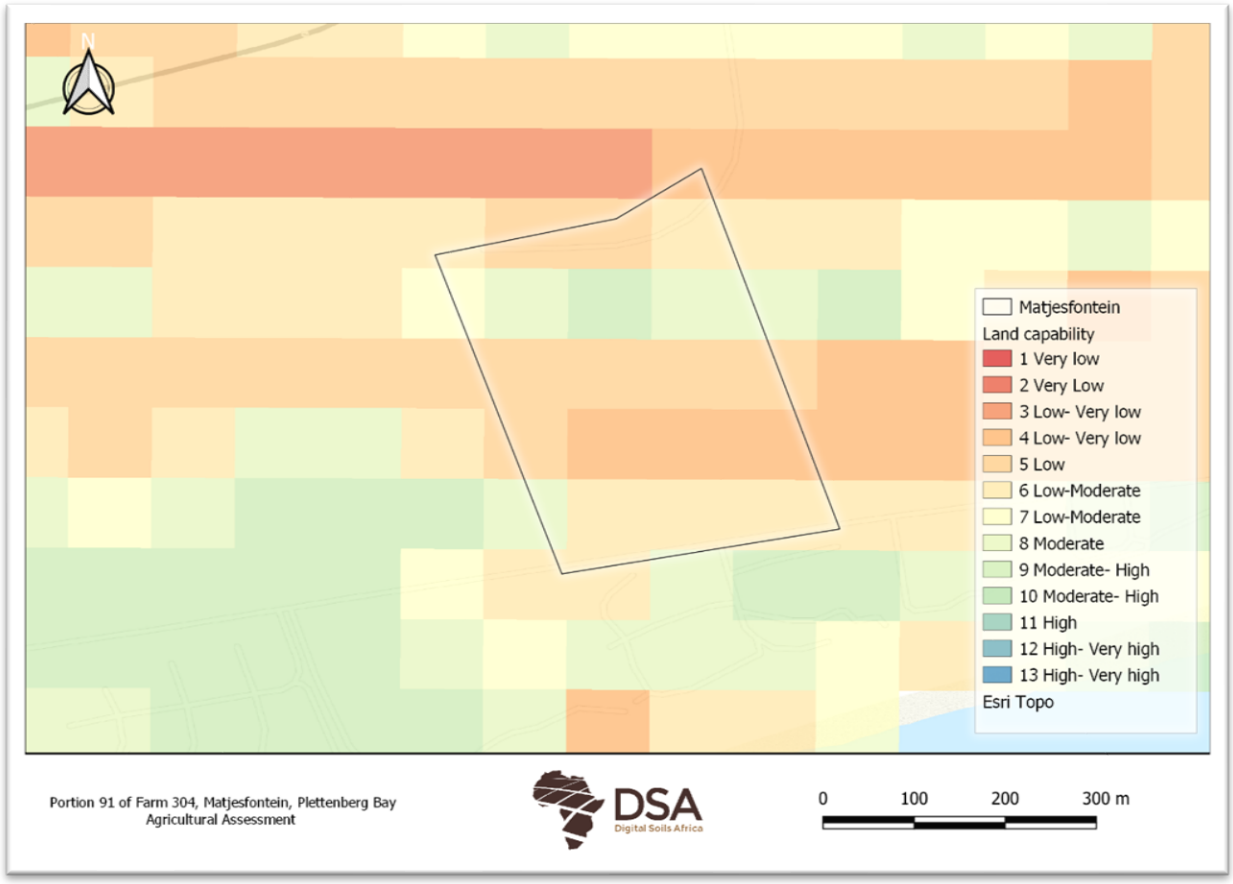


FIGURE 11: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). The site has a low grazing capacity of 54 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).

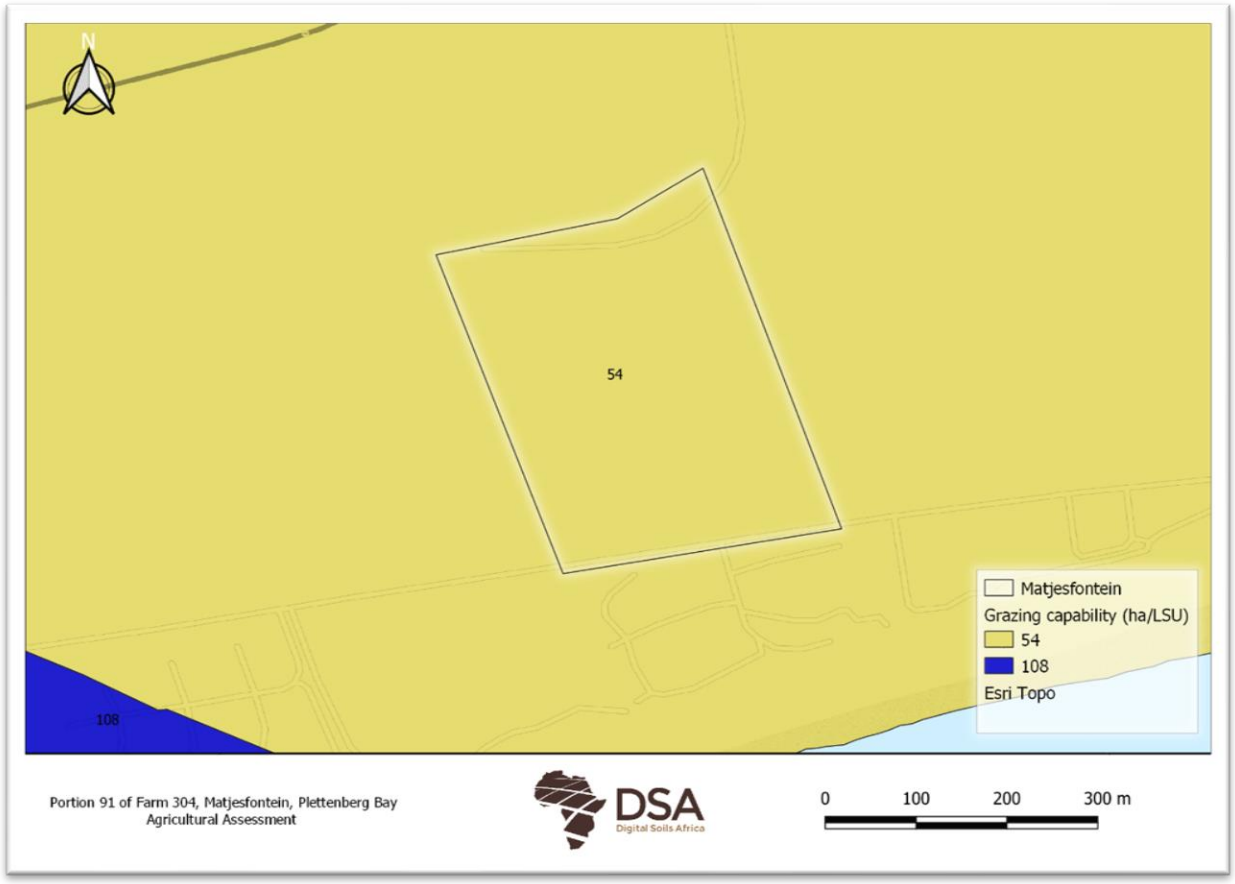


FIGURE 12: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

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), fynbos and fallow land, while the 2014 has an area classified as pastures.

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.
9	Low Shrubland (Fynbos)	This is the same as class 8, Low Shrubland, but now represents low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially inside the SANBI defined boundaries for Fynbos vegetation communities.
42	Fallow Land & Old Fields (Trees)	Long-term, non-active, previously cultivated lands that are now overgrown with tree-dominated woody vegetation. Typically the cultivated land unit boundary is no longer image detectable. Historical field boundaries (supplied by SANBI) have been mapped from archival topographical 1:50,000 maps circa 1950's-70's. This class is only represented if it has not been modified to a more recent, alternative land-cover or land-use class.
47	Residential Formal (Tree)	Built-up areas primarily containing formally planned and constructed residential structures and associated utilities. The dominant vegetation (in gardens etc) is tree-based.
55	Village Scattered	Built-up areas primarily associated with scattered rural settlements and associated utilities. It may include some adjacent areas of subsistence farming, especially if the village structures and fields are inter-mixed. This class is also associated with both structures on individual (commercial or smallholding) farming units, depending on clustering and size. *Scattered villages* are defined as those represented by contiguous / adjacent village-classified cells which collectively *do not form the majority cover* in a surrounding 1 ha window. Note that the class extent includes both bare / non-vegetated and low vegetation covered areas within the village boundary. Woody cover is excluded from this class and represented separately (i.e. classes 2 – 4).

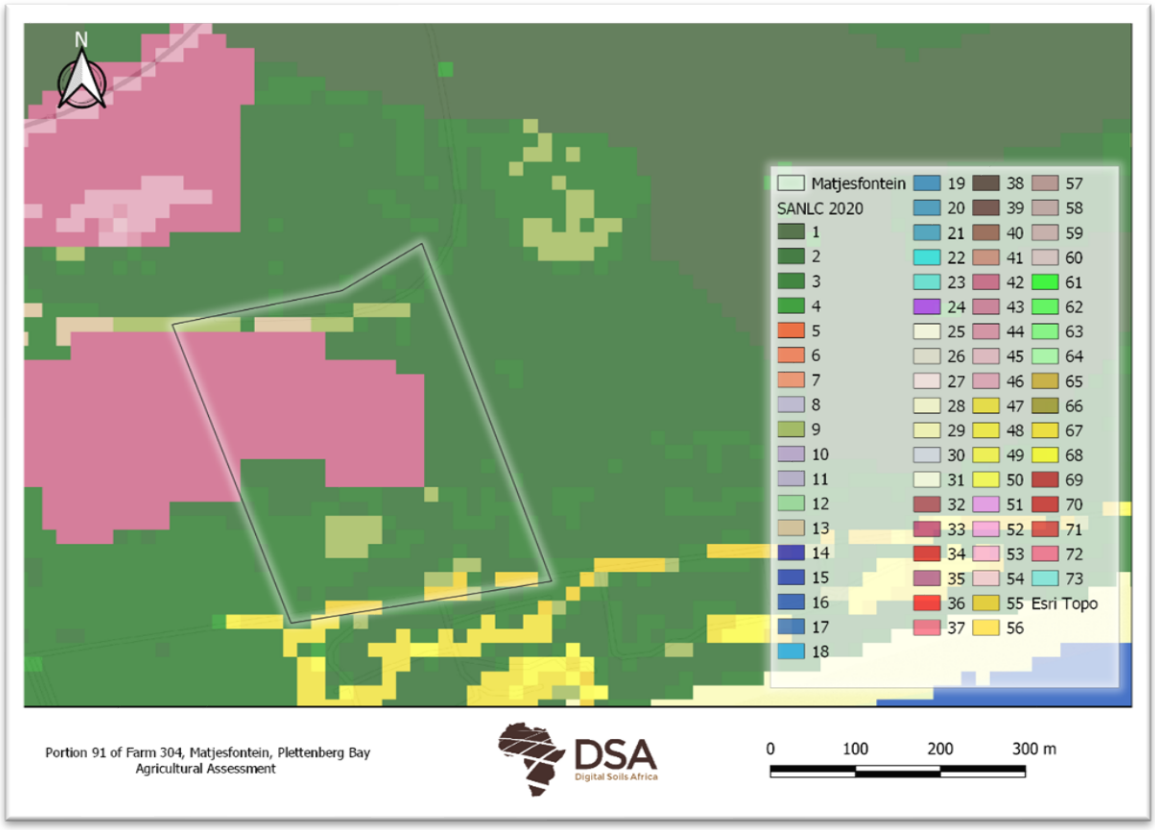


FIGURE 13: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020).

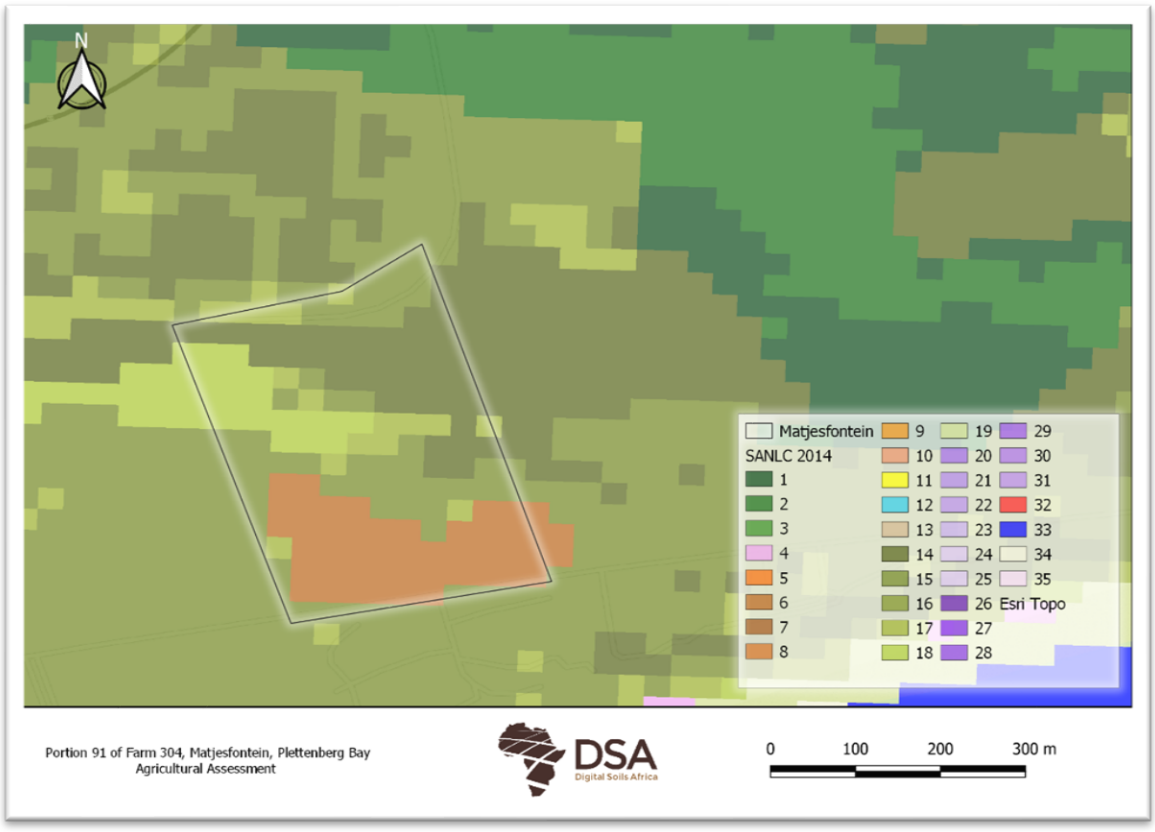


FIGURE 14: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014).

SITE VERIFICATION

LAND USE

The verification of the land use on the study area confirms the forested slopes and thicket on the transition to flat area. Observations on the area marked as high sensitivity due to annually cultivated pastures is disputed. The remanence of the pastures exists but are not cultivated annually. This is collaborated by the the Freshwater Compliance Statement (Confluent, 2022), which states 'dominant plant species are numerous candelabra lilies (*Brunsvigia orientalis*), *Stenotaphrum secundatum* (Buffalo Grass), *Mesembryanthemum* spp. (ice plants), *Romulea* spp. (Froetangs), *Carprobrotus* sp., *Searsia crenata* (Dunekraaibessie), *Salvia aurea* (brown sage), and *Massonia longipes* (coastal hedgehog lily)'.

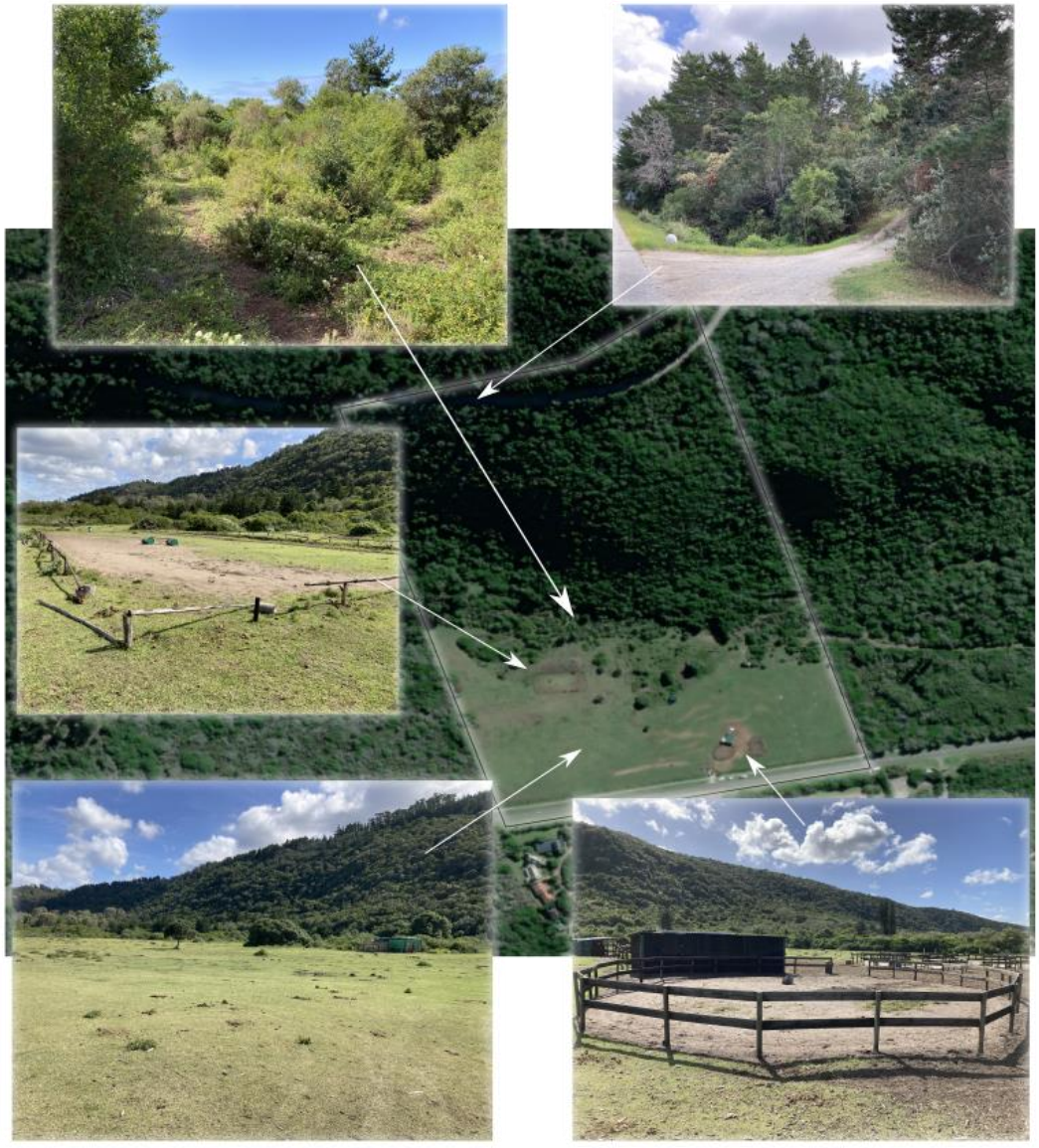


FIGURE 15: LAND USE OF THE STUDY AREA.

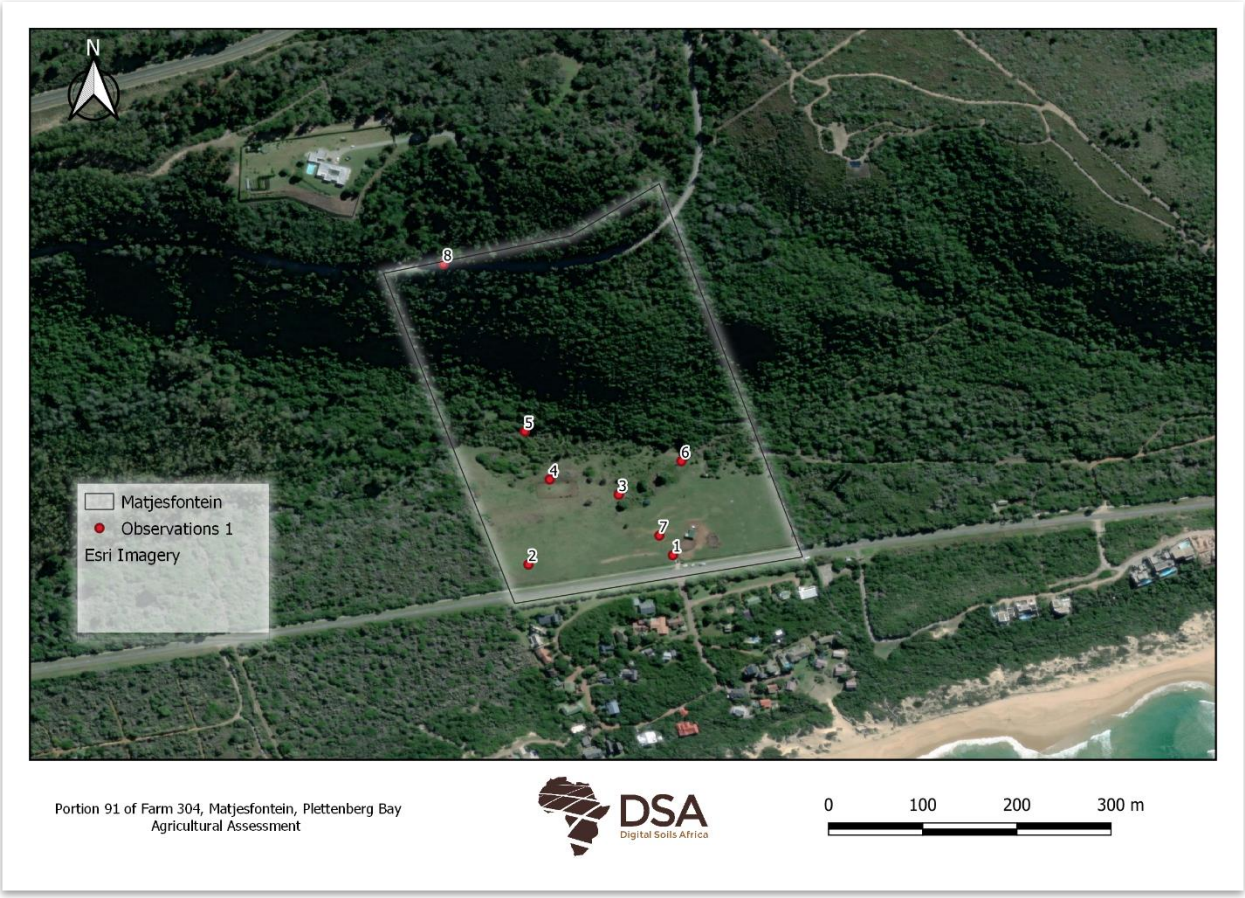


FIGURE 16: OBSERVATIONS MADE DURING THE STUDY.

LAND CAPABILITY

The verification of the soil on the study area suggests that the soils are relatively homogenous, and that there are shallow soils on the steep slopes and sandy soils occupying the old lands. The observations on the slopes were classified as Glenrosa soil form. This is a shallow topsoil overlying a lithic horizon. This is a low soil capability soil. The sandy soils occupying the old lands are classified as Fernwood soils, with a darkened topsoil and grey subsoils. Water holding capacity will be limited but the climate will assist with plant growth, as illustrated by the high climate capability. Very sandy material was found on the study area and seems transported.

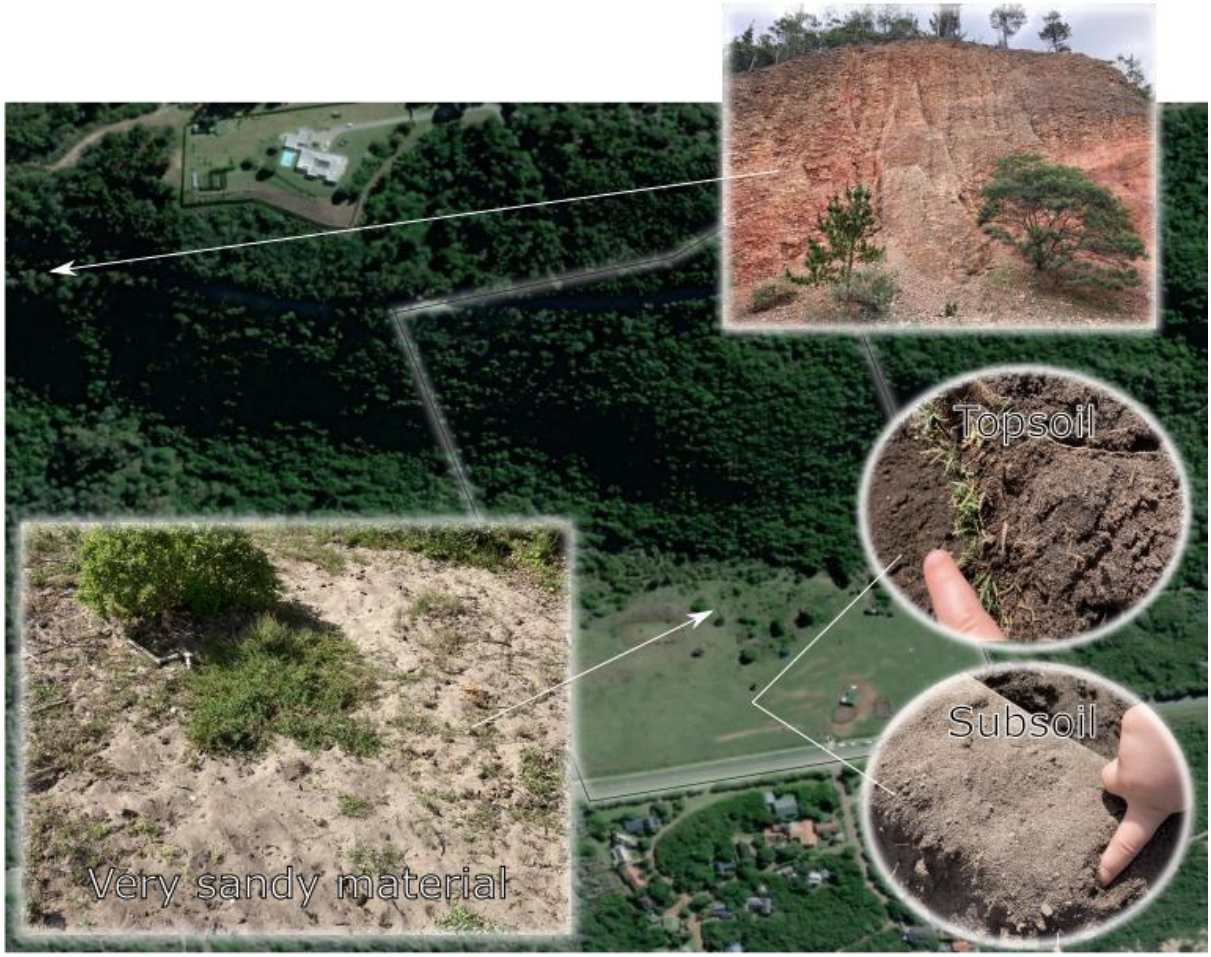


FIGURE 17: SOIL PROPEORTEIES OF THE STUDY AREA.

The elevation profile from google earth suggests that the slopes from the road in the north to bottom of the slopes are too steep for agricultural practices (Figure 18) and that only the area previously used as lands is viable.

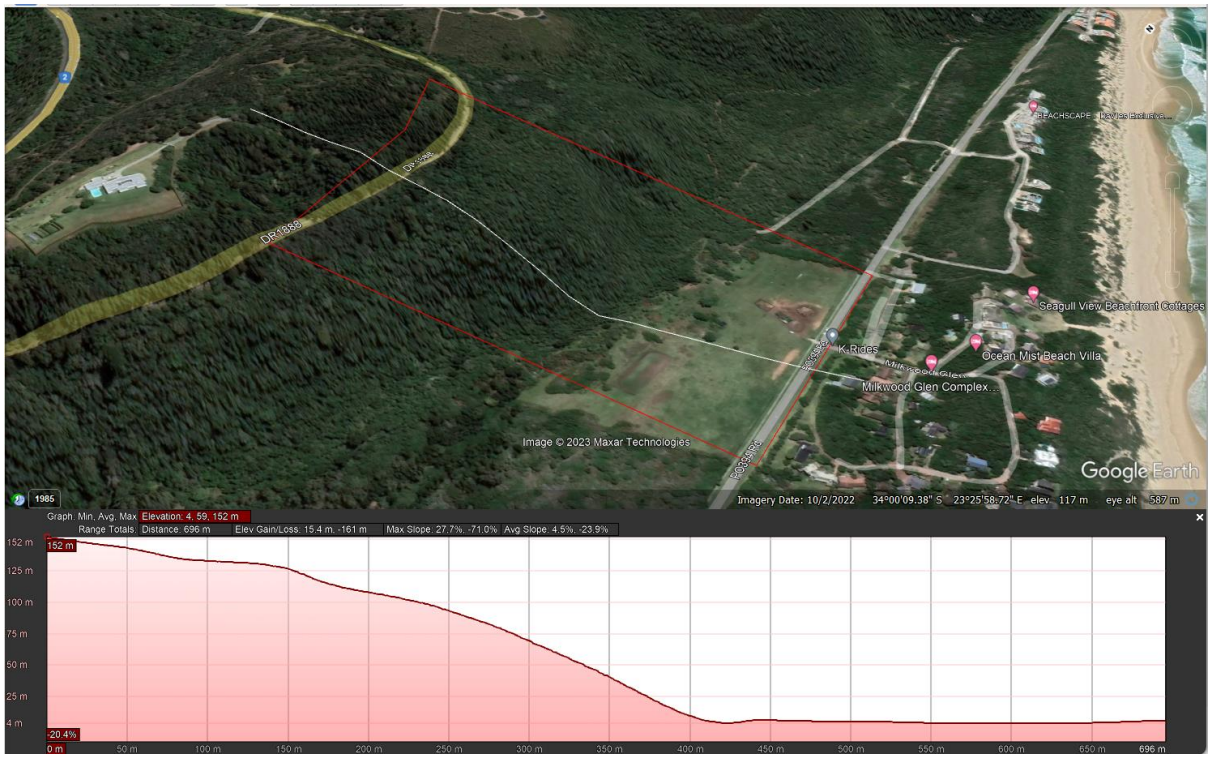


FIGURE 18: ELEVATION PROFILE OF THE STUDY AREA (GOOGLE EARTH).

COMPLIANCE STATEMENT

According to the screening tool, the site is classified as having a high agricultural sensitivity due to existing cultivated pastures. The soil observations found the land capability to be low on slopes due to shallow soils and steep slopes. The lower lying area in the south had a moderate land capability. The grazing was considered low quality, and no evidence of cultivation was present.

Therefore, the sensitivity of the area was amended to low and medium (Figure 19).

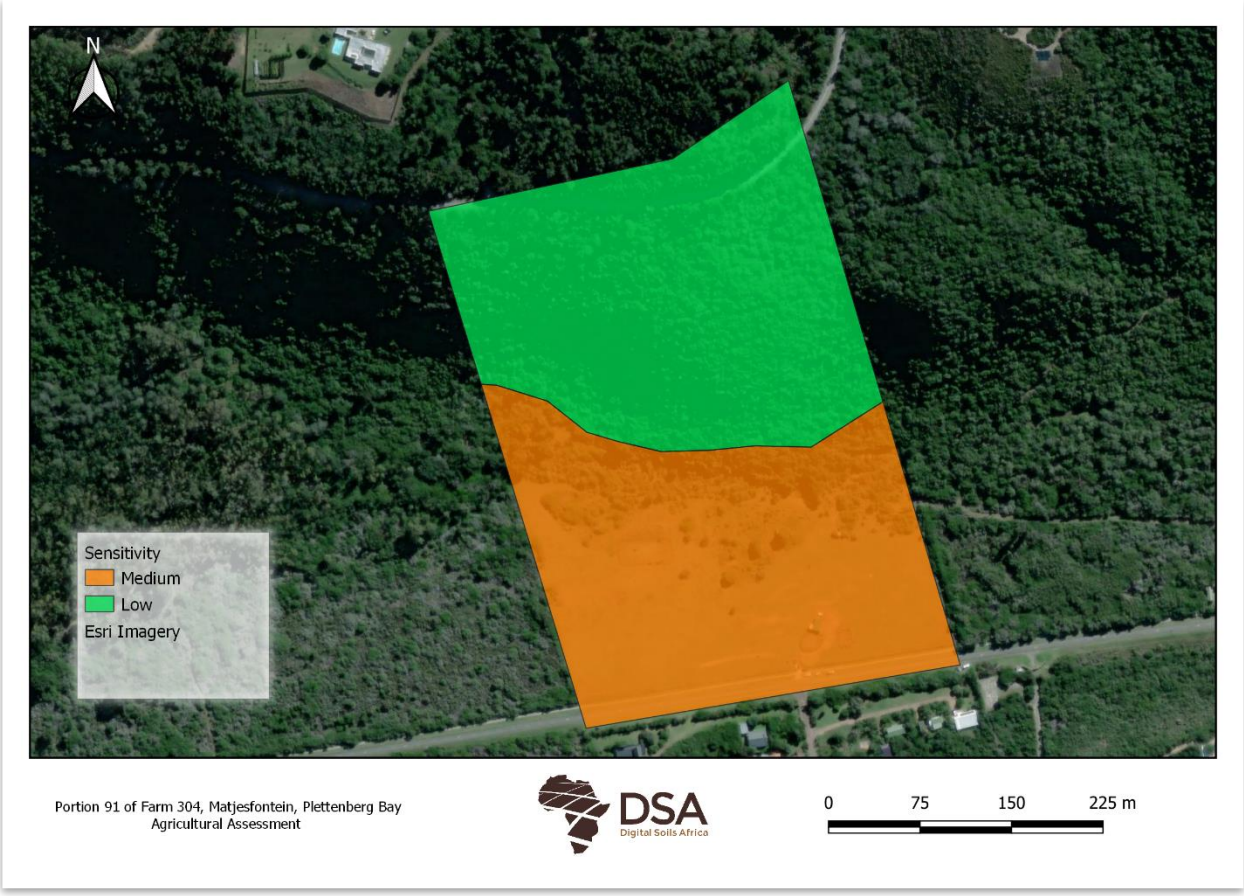


FIGURE 19: SENSITIVITY OF STUDY AREA.

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