AGRICULTURAL ASSESSMENT FOR SECTION 24G APPLICATION AT SHABBY FUFU, PLETTENBERG BAY, WESTERN CAPE

PREPARED FOR

ENVIROAFRICA CC

APRIL 2024

DSA
Digital Soils Africa

+27 83 703 3002

www.dsafrica.co.za

darren@dsafrica.co.za

Kemsley Street

Port Elizabeth

Directors:
Dr Darren Bouwer
Prof Johan Van Tol
Prof George Van Zijl

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BACKGROUND TO THE STUDY

Digital Soils Africa (Pty) LTD (DSA) was tasked by Enviroafrica CC to undertake an Agricultural Assessment as part of a section 24G application 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, the unlawful activities are in contravention of Section 24F of the NEMA, and include activities listed in terms of the NEMA EIA Regulations, 2014.

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.

The study area is located on Shabby Fufu Lifestyle Farm, near Plettenberg Bay, in the Western Cape Province. The unlawful development in terms of NEMA includes the construction of tourist facilities (restaurant and farm store), parking area, main house (used as a guest house), kids' play area, plant nursery, labourer's cottages, and other associated infrastructure. Additionally, there is the development of a farm dam on Portion 4 of Farm Harkerville No. 428. The activity involves the commencement of the clearance of indigenous vegetation, construction of a dam within a watercourse, and the transformation of land without environmental authorization.

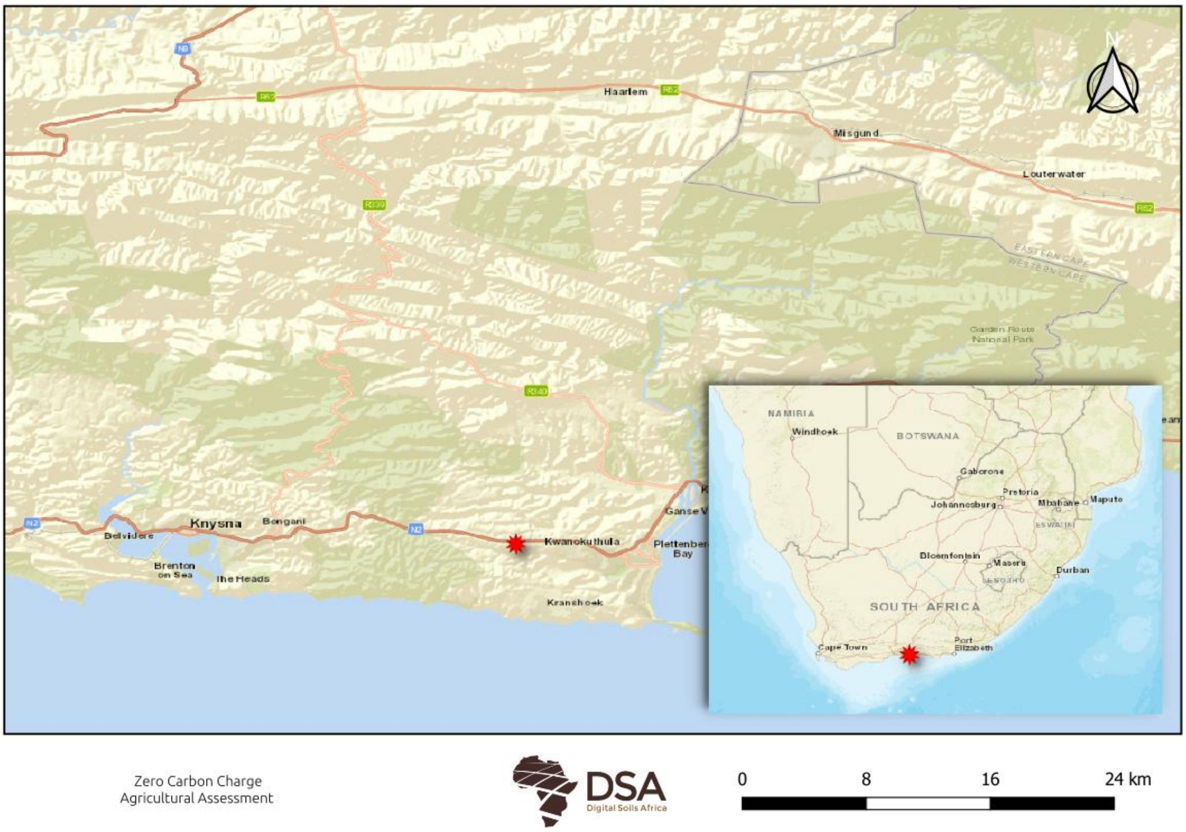


FIGURE 1: LOCATION OF THE STUDY AREA IN THE WESTERN CAPE PROVINCE.

ENVIRONMENTAL SCREENING TOOL

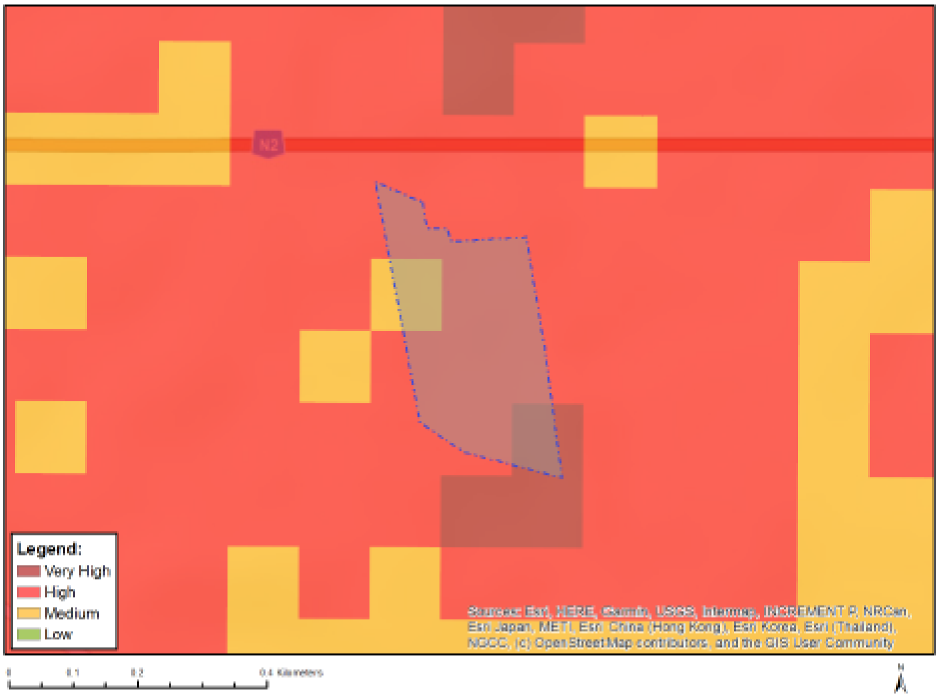
Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

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 to the land use being annual crop cultivated pastures (Figure 3). The land capability (DAFF, 2017) classifies the soils as having a high land capability (Figure 4).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
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.

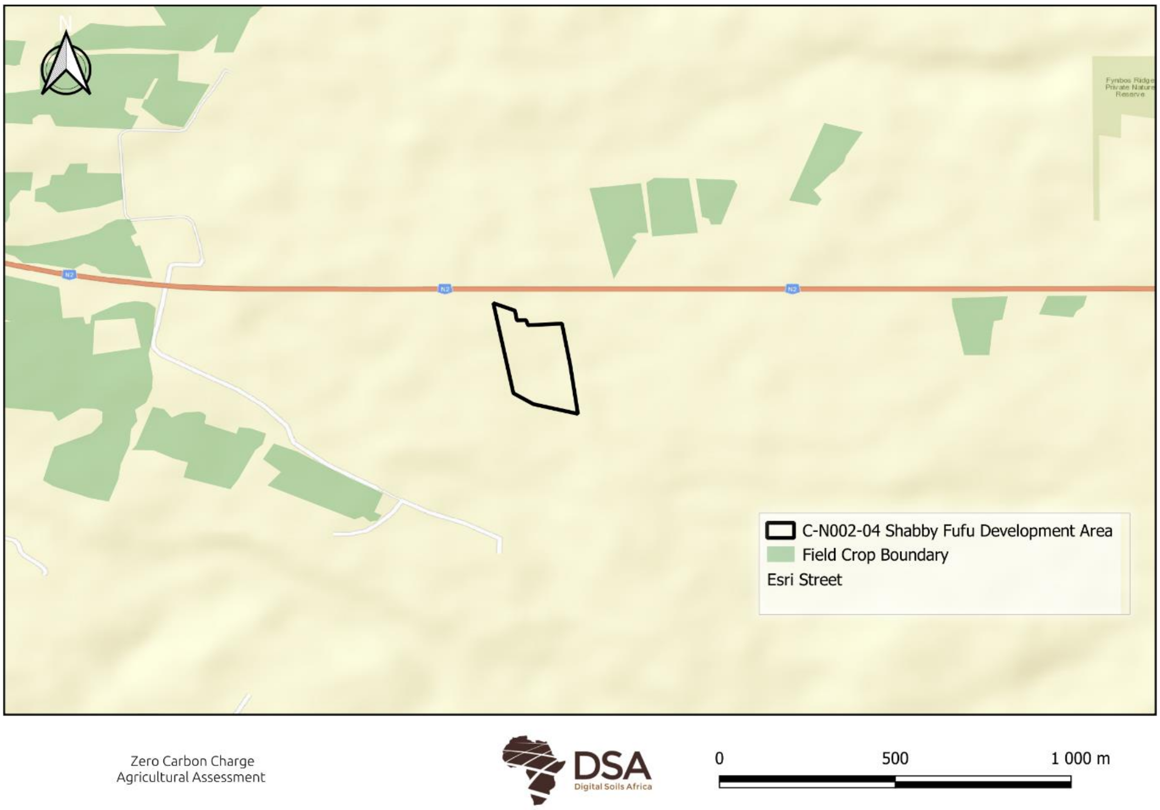


FIGURE 3: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL.

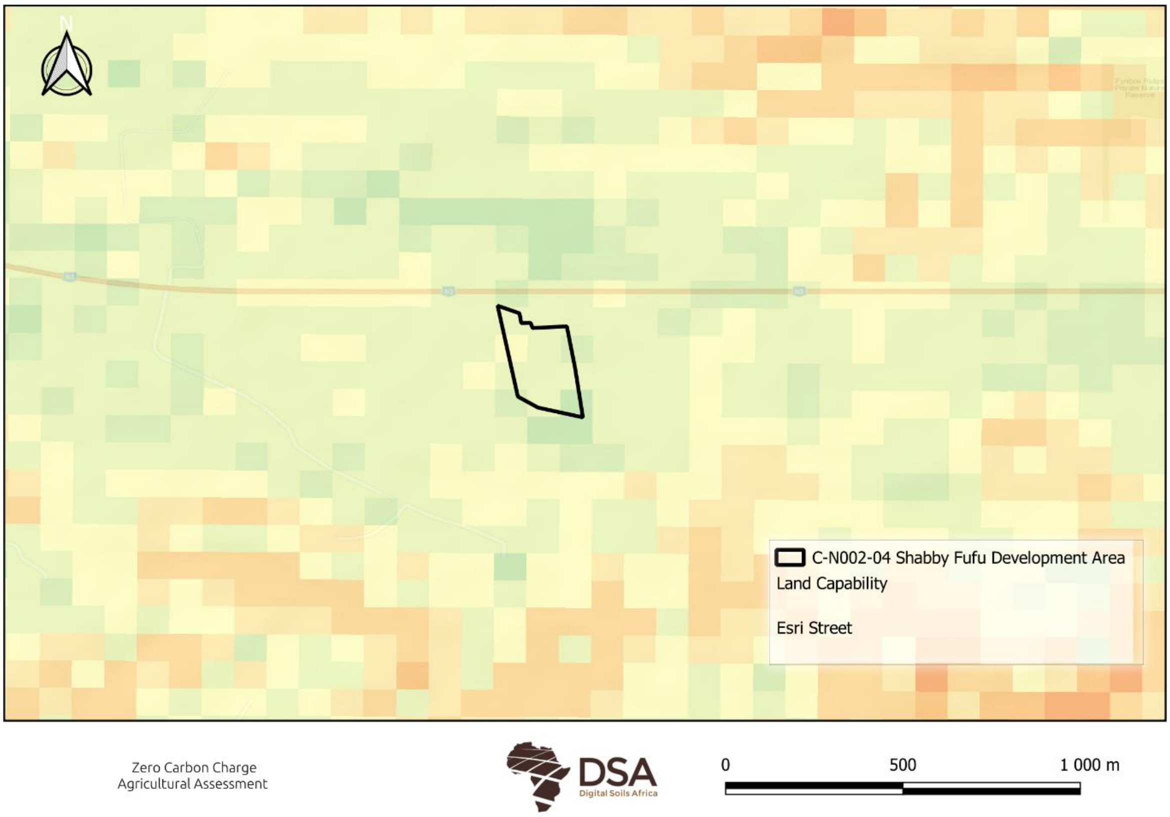


FIGURE 4:THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL.

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 within a Protected Agricultural Area (Figure 5).

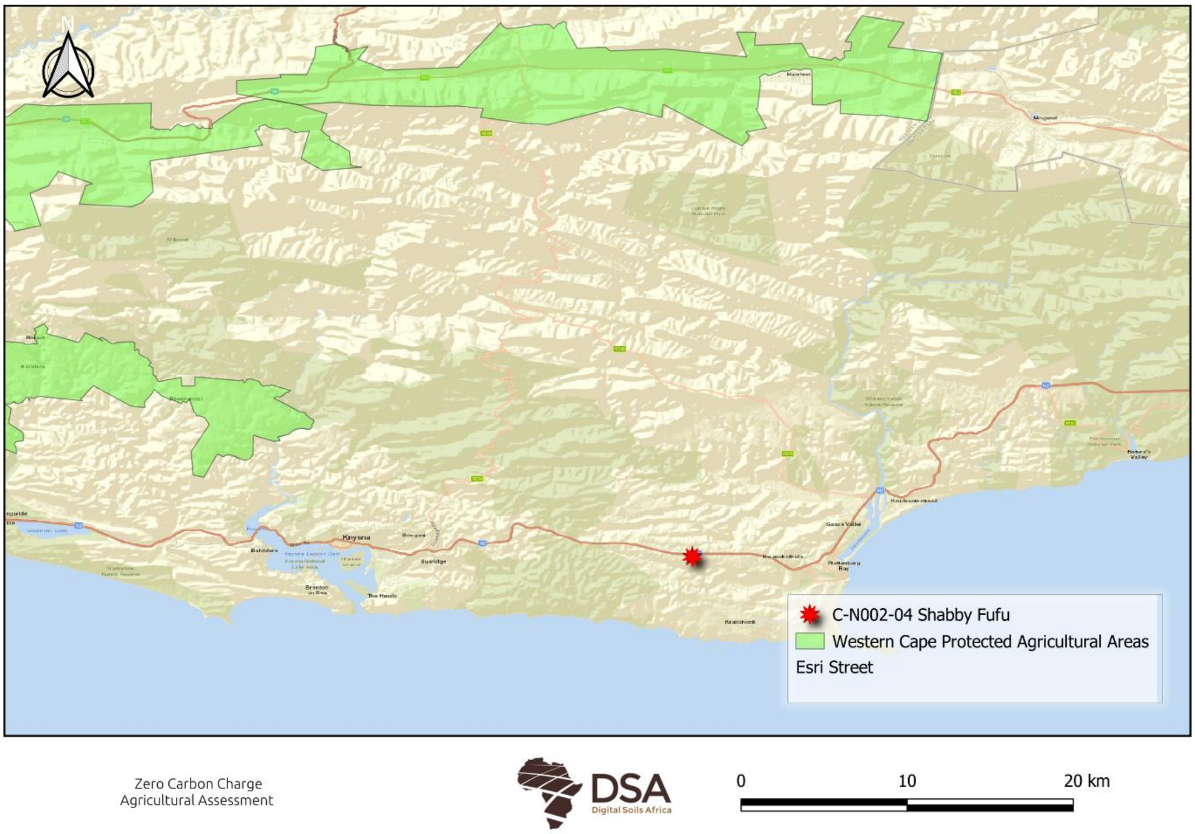


FIGURE 5: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

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. (**pg26**)
- The compliance statement must:
- be applicable to the preferred site and proposed development footprint **(pg6)**;
- confirm that the site is of "low" or "medium" sensitivity for agriculture**(pg26)**;

- indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site **(pg26)**.
- 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 **(pg26)**;
- 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 **(pg8)**;
- confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities **(pg26)**;
- 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 **(pg26)**;
- any conditions to which the statement is subjected **(pg26)**;
- 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 **(pg26)**.

RESULTS

CLIMATE CAPABILITY

The climate is warm and temperate. The Köppen-Geiger climate classification is Cfb, and there is significant rainfall throughout the year. The average annual temperature is 16.9 °C. The area has an annual precipitation of about 663 mm. The site has a humid climate (Figure 6). Therefore, cultivation of dry land crops will be possible.

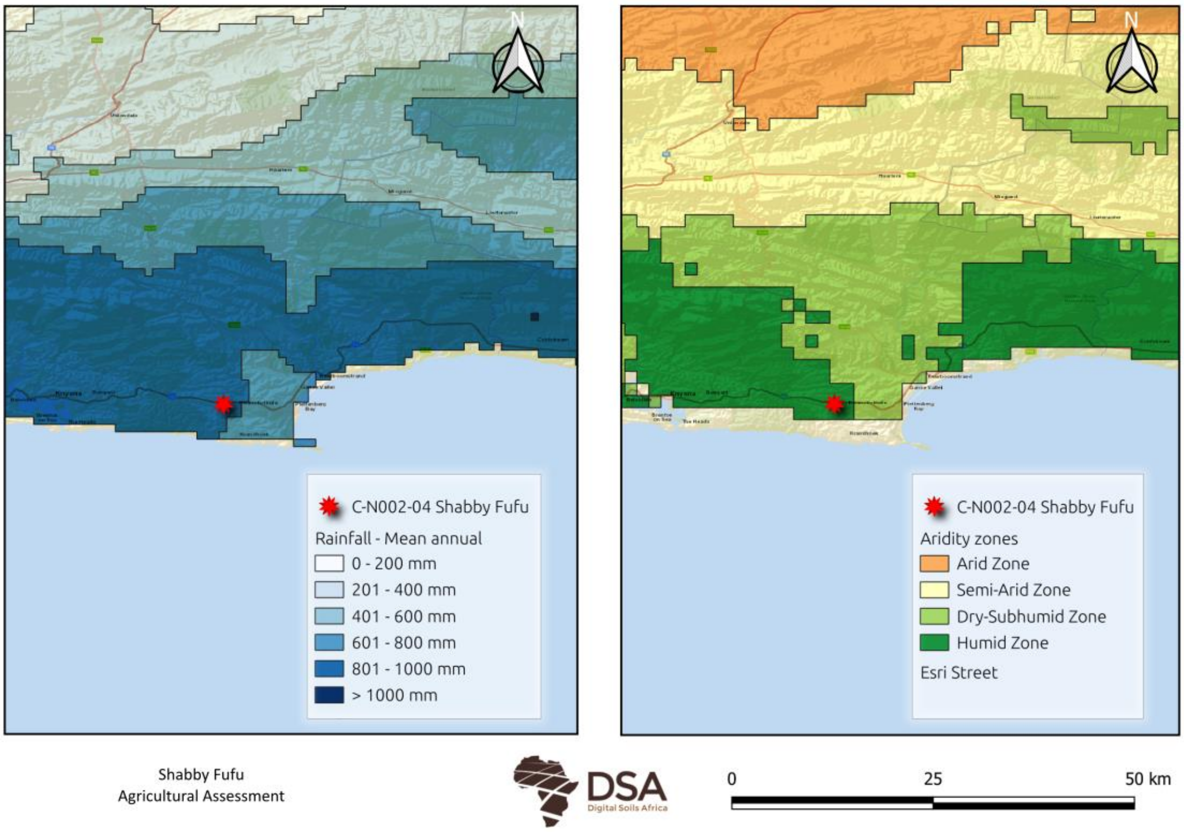


FIGURE 6: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

TABLE 1: CLIMATIC PROPERTIES OF PLETTENBERG BAY, WESTERN CAPE PROVINCE (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.

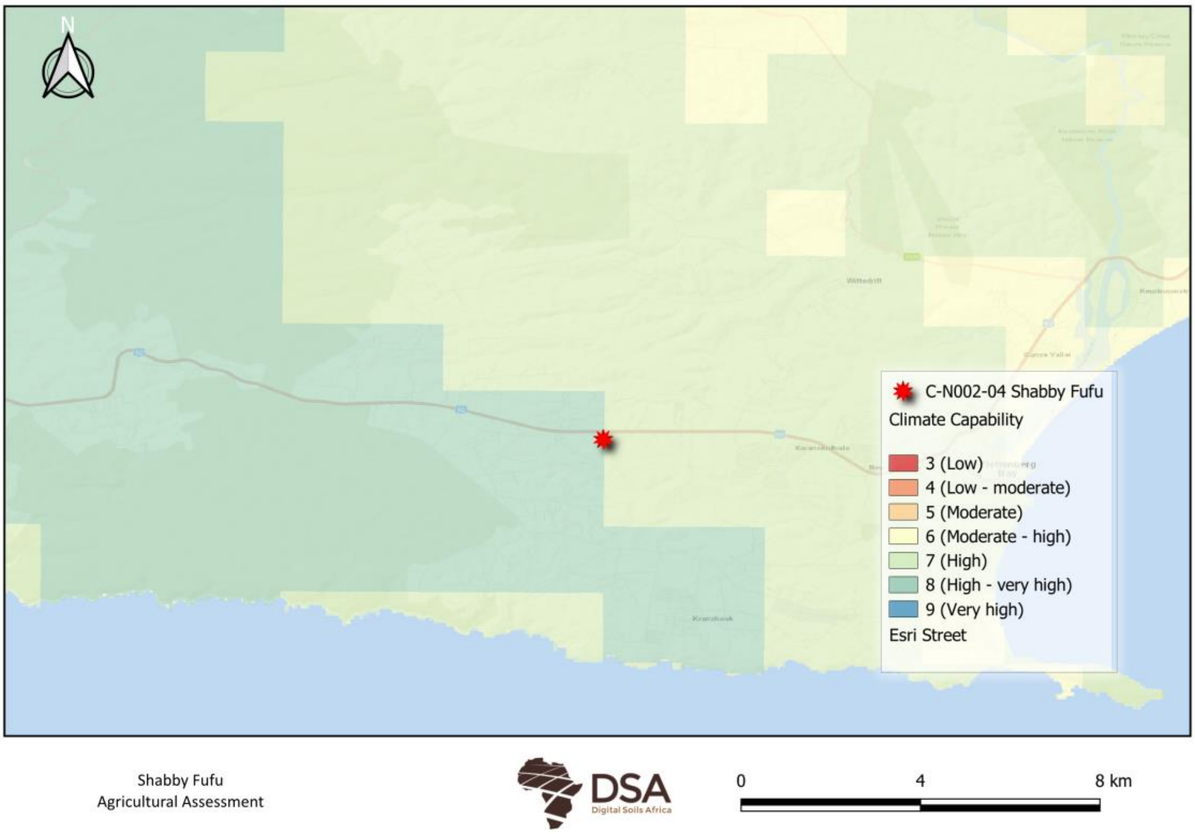


FIGURE 7: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 Ca (46) land type (Land Type Survey Staff, 1972 – 2002) (Figure 8). Ca landtypes comprise of sandy, good drainage topsoils overlaying plinthic subsoils. These plinthic subsoils can hold water but may cause waterlogging issues. The Land type Db (27) consists of duplex soils (clayey subsoils) and are also present in the surrounding area.

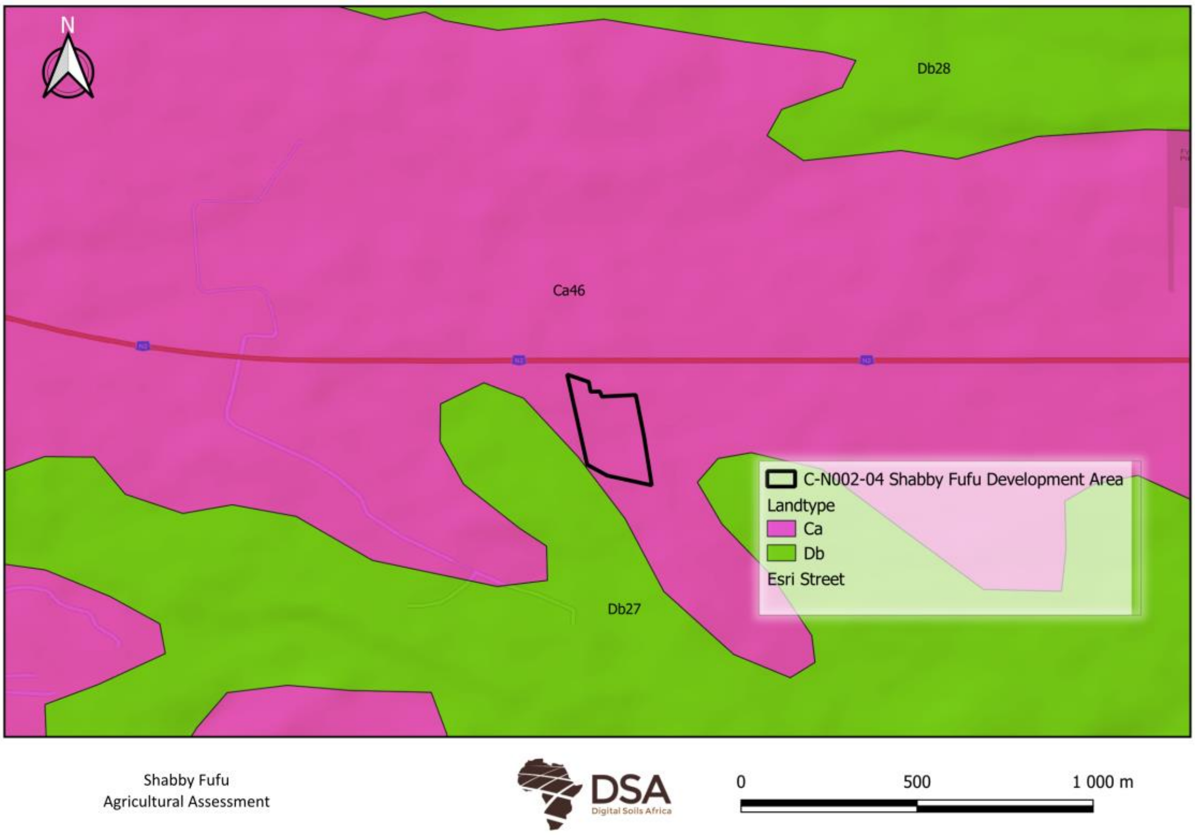


FIGURE 8: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

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 (low to moderate) and 6 (moderate to high) (Figure 9). This is considered a moderate soil capability.

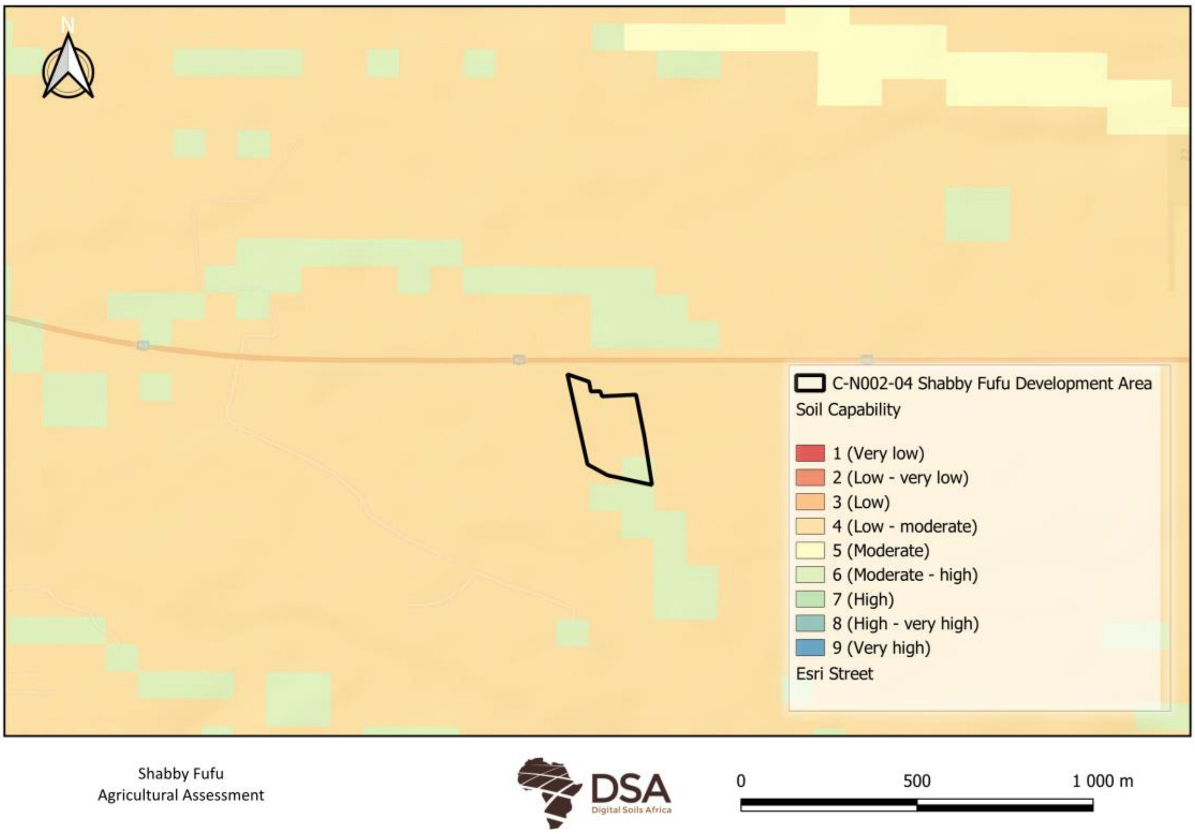


FIGURE 9: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 (moderate) and 6 (moderate to high). This is generally considered a 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

Not arable

Arable

The Land capability values of between 8 (moderate) and 11 (high), which is in the range of arable soils (8-15), with high land capability (Figure 11).

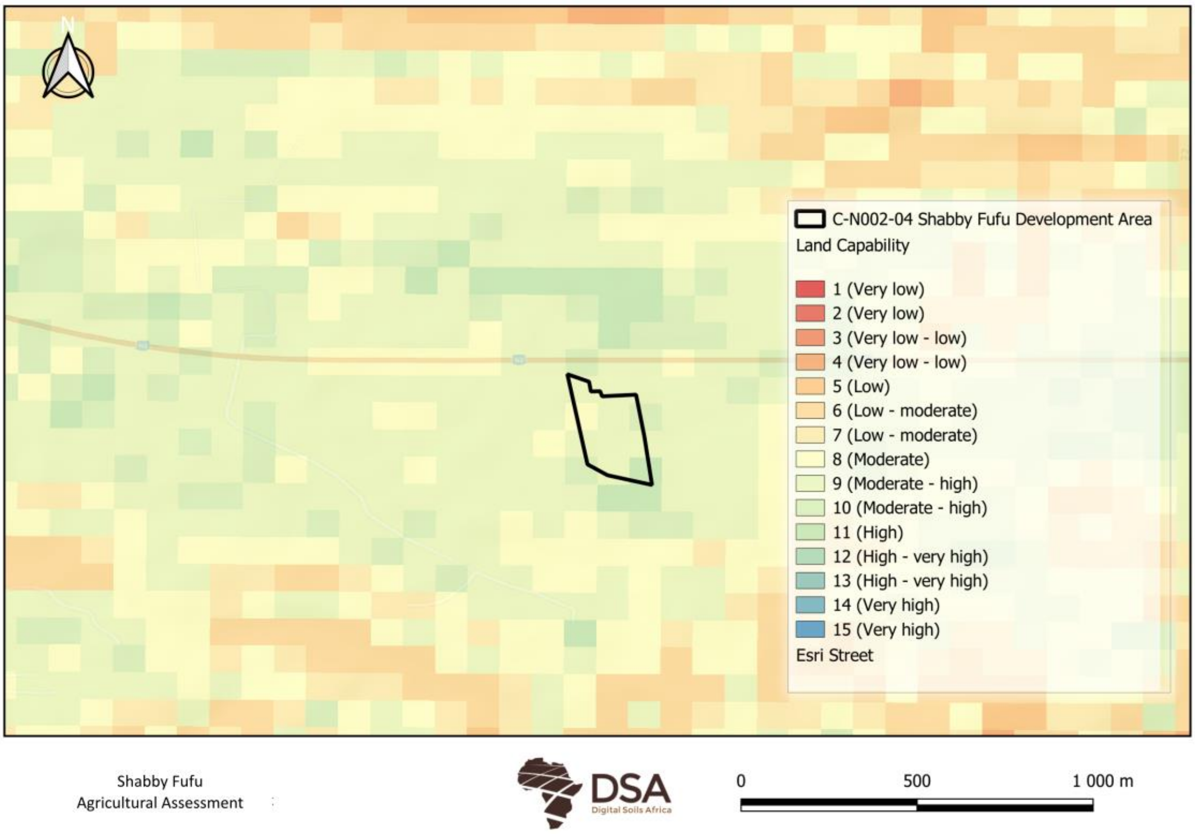


FIGURE 11: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). The site has a very low grazing capacity of 108 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).

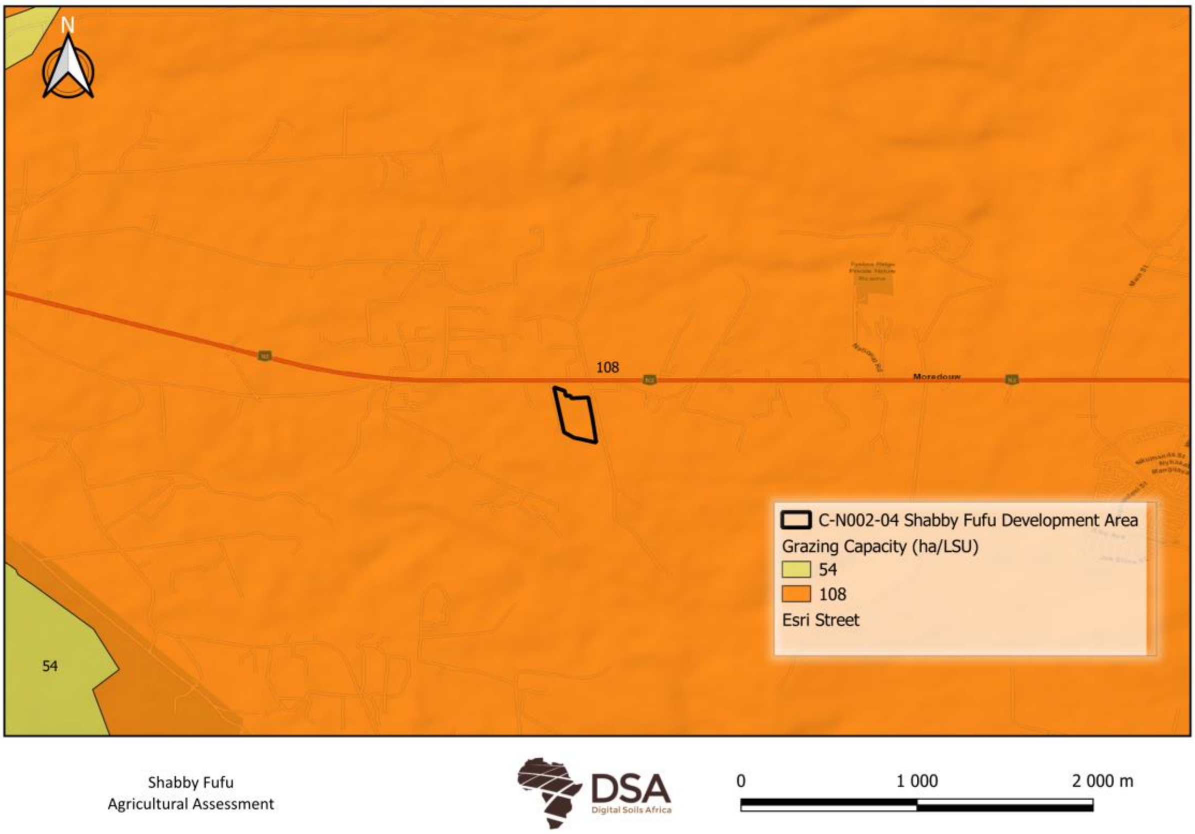


FIGURE 12: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

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. SANLC 2020 classifies the area as predominantly cultivated commercial annuals (40), with the slight presence of dense plantation forests (5), temporary unplanted plantation forests (7) and an artificial dam (19) (Figure 13).

TABLE 3: LEGEND TO FIGURE 13

No.	Class Name	Class Definition
5	Contiguous & Dense Planted Forest	Dense to contiguous cover, planted tree forests, consisting primarily of exotic timber species, with canopy cover exceeding 35%, and canopy heights exceeding 2.5 metres. Typically represented by mature commercial plantation tree stands. This class also includes smaller woodlots and windbreaks, where they have been identified by the same spectral-based image modelling procedures used to detect the plantation forests.
7	Temporary Unplanted Forest	Temporarily unplanted stands within commercial forest plantations that have recently been harvested, and/or re-planted but the tree saplings are undetectable on the imagery. Note: to a large degree the extent of these 2018 clear-felled plantation areas has been informed and guided by areas classified as plantations with standing trees in the 2013-14 SANLC dataset, but not having any detectable plantation tree cover in SANLC 2018; as long as no other alternate land-cover or land-use class has replaced the plantation forests.
19	Artificial Dams	Man-constructed artificial inland waterbodies, ranging from small farm dams to large reservoirs, and if image-detectable, large irrigation canals. The spatial extent of classified water is the cumulative extent of all image-detectable water surfaces from all available images used in the production of the NLC dataset; which is comparable to the annual maximum extent. Note that the occurrence of rooted or floating emergent aquatic vegetation that covers the water surface may influence the area of image-detected open water.
40	Cultivated Commercial Annuals Non-Pivot / Non-Irrigated	Active or recently active cultivated lands used for the production of agricultural crops, in this case specifically associated with commercial annual crops, The plants only remain in the field for one growing seasons and one harvest, and are grown non-irrigated, rainfed fields.

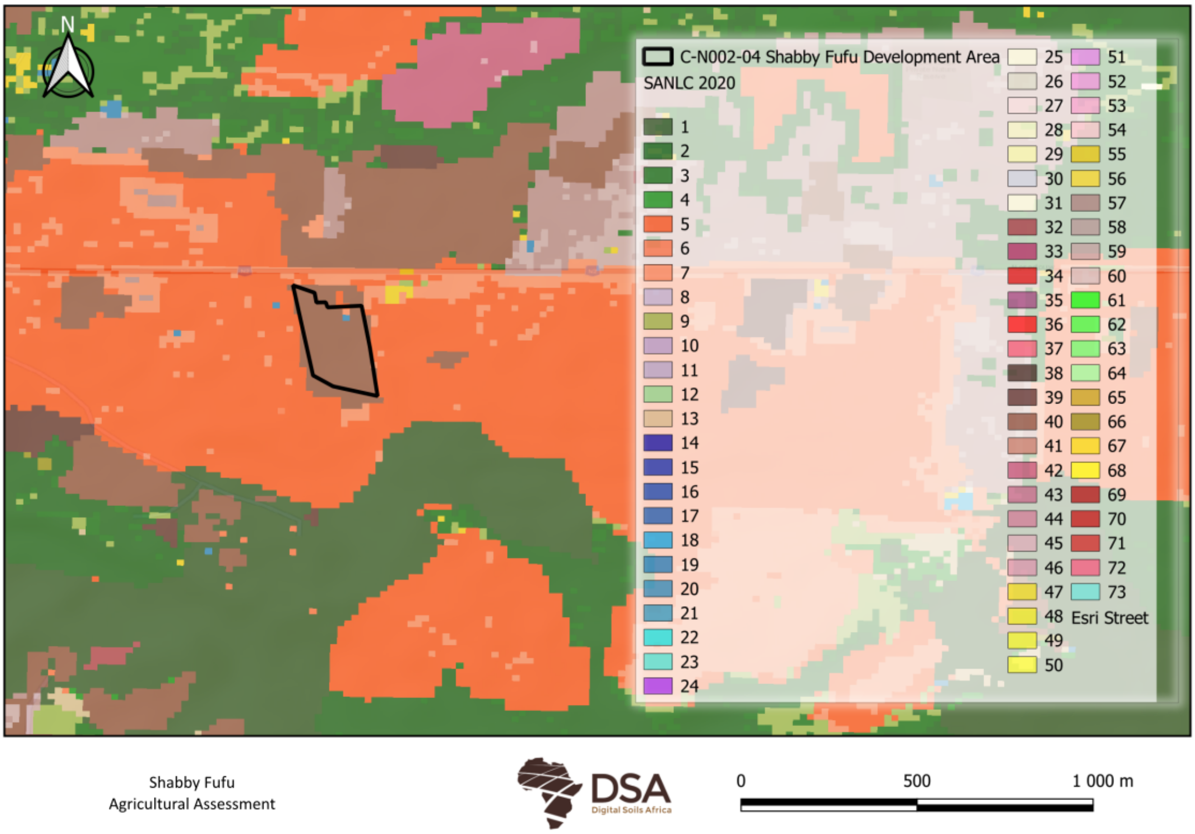


FIGURE 13: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020).

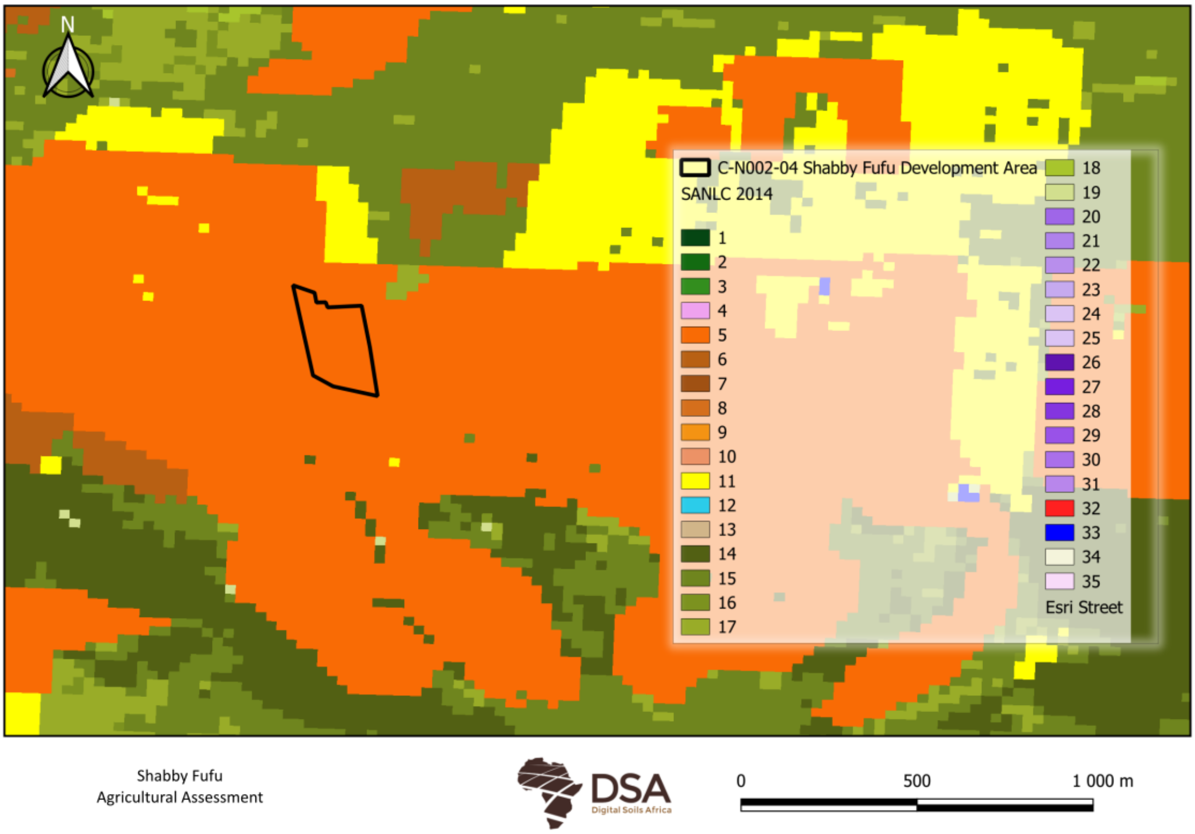


FIGURE 14: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014).

From Figure 15-18, the land-use of the area did change from being a predominantly unplanted or planted forest plantation (2014) to cultivated crop pastures in the North of the site. Figure 15 and 16 indicates that the trees were cut down in the northwestern side of the study area. In 2020 the dam and a rectangular development have emerged on the property. In 2021, the development of the farm stall and parking lot are seen. The change can be clearly seen in Figure 17-18.

FIGURE 15: GOOGLE EARTH IMAGE (2011) OF C-N002-04 SHABBY FUFU.

FIGURE 16: GOOGLE EARTH IMAGE (2014) OF SHABBY FUFU.

FIGURE 17: GOOGLE EARTH IMAGE (2020) OF SHABBY FUFU.

FIGURE 18: LATEST GOOGLE EARTH IMAGE (2022) OF SHABBY FUFU.

RESULTS AND CONCLUSION

Digital Soils Africa conducted an Agricultural Assessment for EnviroAfrica CC as part of a section 24G application under the National Environmental Management Act, 1998. The study, focused on Shabby Fufu Lifestyle Farm near Plettenberg Bay, identified several unlawful developments, including tourist facilities, a farm dam, and other infrastructure. The Environmental Screening Report classified the area as highly sensitive for agricultural purposes due to a very high land capability.

LAND USE

A comparison of the South African National Land-Cover 2020 (SANLC 2020) with the 2014 Land Cover revealed conflicting classifications in the study area. SANLC 2020 indicates the area is mainly cultivated commercial annuals, with some dense plantation forests, temporary unplanted forests, and an artificial dam. The land use shifted from primarily unplanted or planted forest plantations in 2014 to cultivated crop pastures in the north of the site. Notable changes include the removal of trees in the northwest, the emergence of a dam and a rectangular development in 2020, and the addition of a farm stall and parking lot by 2021.

During site verification, cultivated flowers and net covered controlled cultivation were also found on site (Figure 19).

FIGURE 19: THE CURRENT AGRICULTURAL ACTIVITIES.

SOIL CAPABILITY

The Ca land types at Shabby Fufu are generally considered to have high land capability due to their well-drained horizon overlying a plinthic horizon. However, these soils, classified as Longlands, are prone to saturation, with the plinthic horizon depth ranging from 400 to 600 mm. During the site visit, stagnant water was observed within the soil profile, indicating a high water table. These soils are suitable for crops not sensitive to saturation or acid soils, like pastures, but have limitations for many conventional crops, thus not classified as high capability.

The unlawful activities had mixed impacts on agriculture. There was a minor loss of grazing land, but the overall area affected was small. On the positive side, the activities promoted diverse cultivation, and the dam will benefit agricultural practices on the farm. Overall, the impact on agriculture is minimal.

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: 6**

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