AGRICULTURAL ASSESSMENT FOR MULILO NEWCASTLE WIND POWER, KWAZULU-NATAL PROVINCE

PREPARED FOR

GREENMINDED

NOVEMBER 2024

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BACKGROUND TO THE STUDY

Digital Soils Africa (Pty) LTD (DSA) were tasked by Mulilo Newcastle Wind Power (Pty) Ltd, 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 most of the area as being of medium sensitivity for the Agricultural theme. The Agricultural Assessment 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 site is located near Newcastle in KwaZulu-Natal Province, South Africa (Figure 1).

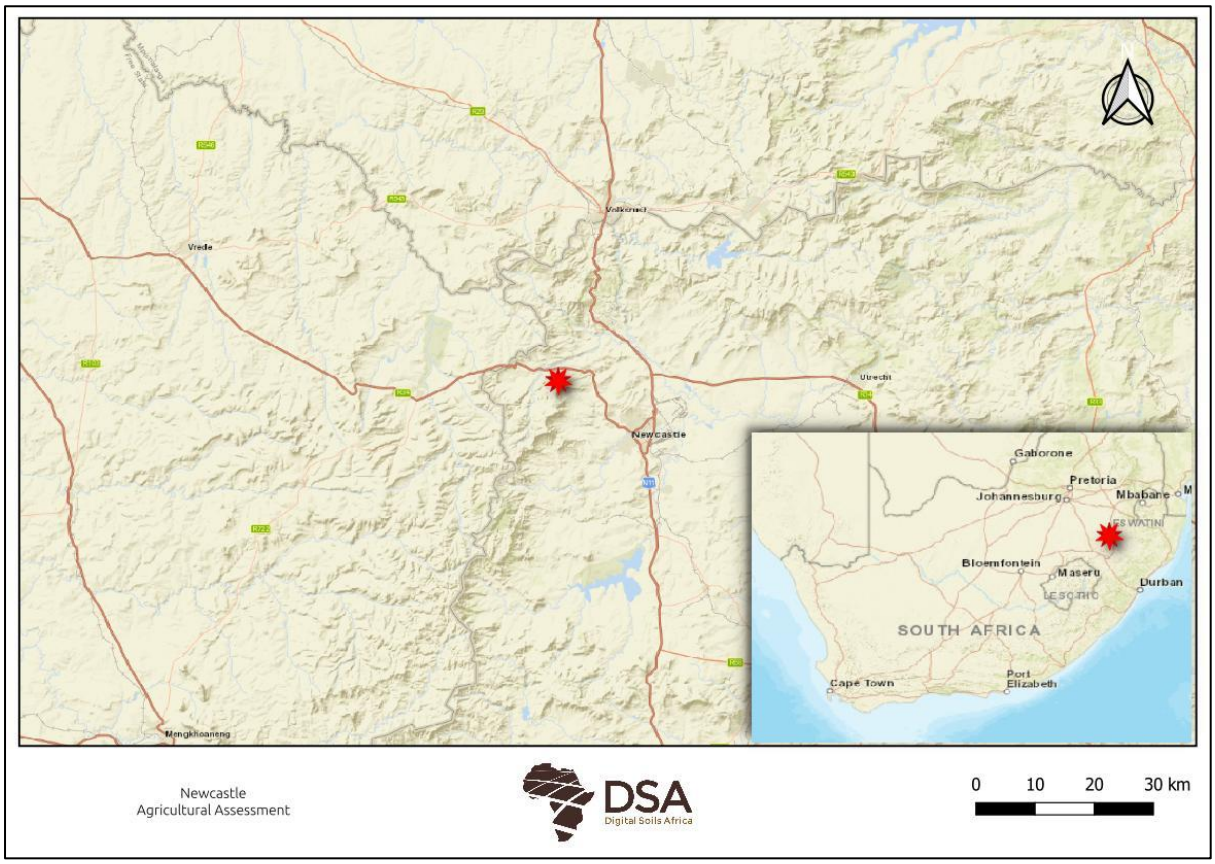


FIGURE 1: LOCATION OF THE STUDY AREA IN THE KWAZULU-NATAL PROVINCE.

ENVIRONMENTAL SCREENING TOOL

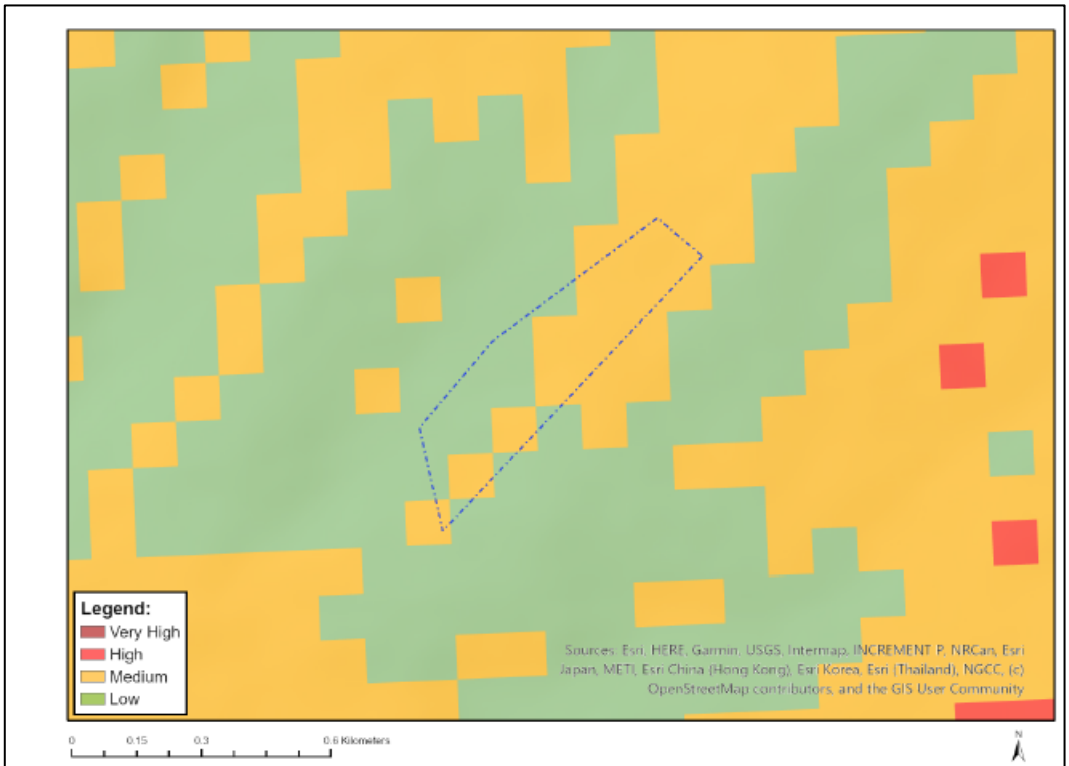
Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

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 South African National Land Cover (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 of sites BP1, BP2, BP3 and BP4 is classified as medium agricultural sensitivity and agricultural sensitivity of site BP5 is classified as high agricultural sensitivity (Figure 2 - Figure 6). The land capability (DAFF, 2017) classifies the soils as having a medium land capability for sites BP2 and BP3, low to medium land capability for sites BP1 and BP4 and low to high land capability for site BP5 (Figure 7). There are no crops in the sites according to the screening tool (Figure 8).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
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

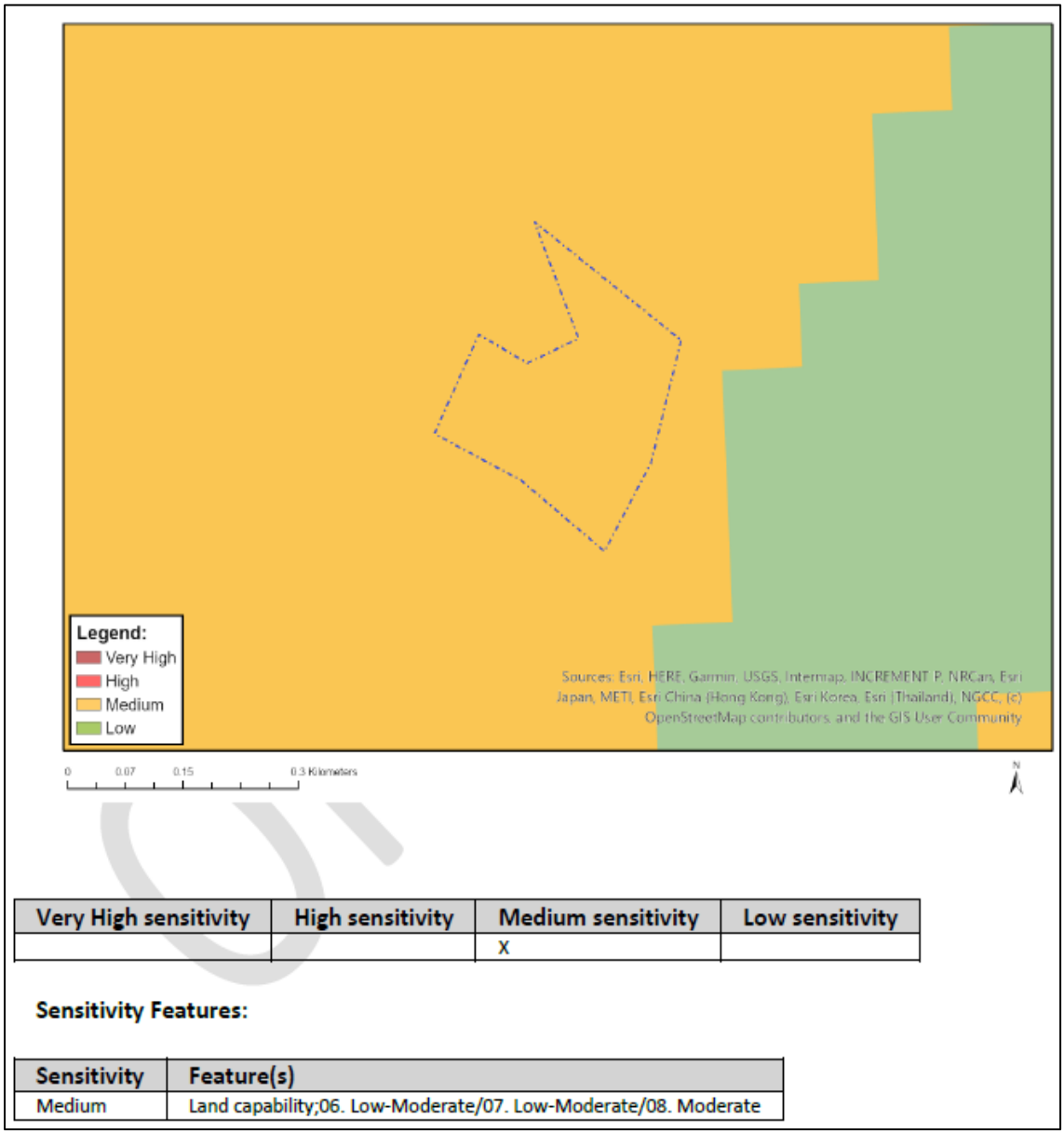
FIGURE 2: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR SITE BP1.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

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

FIGURE 3: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR SITE BP2.



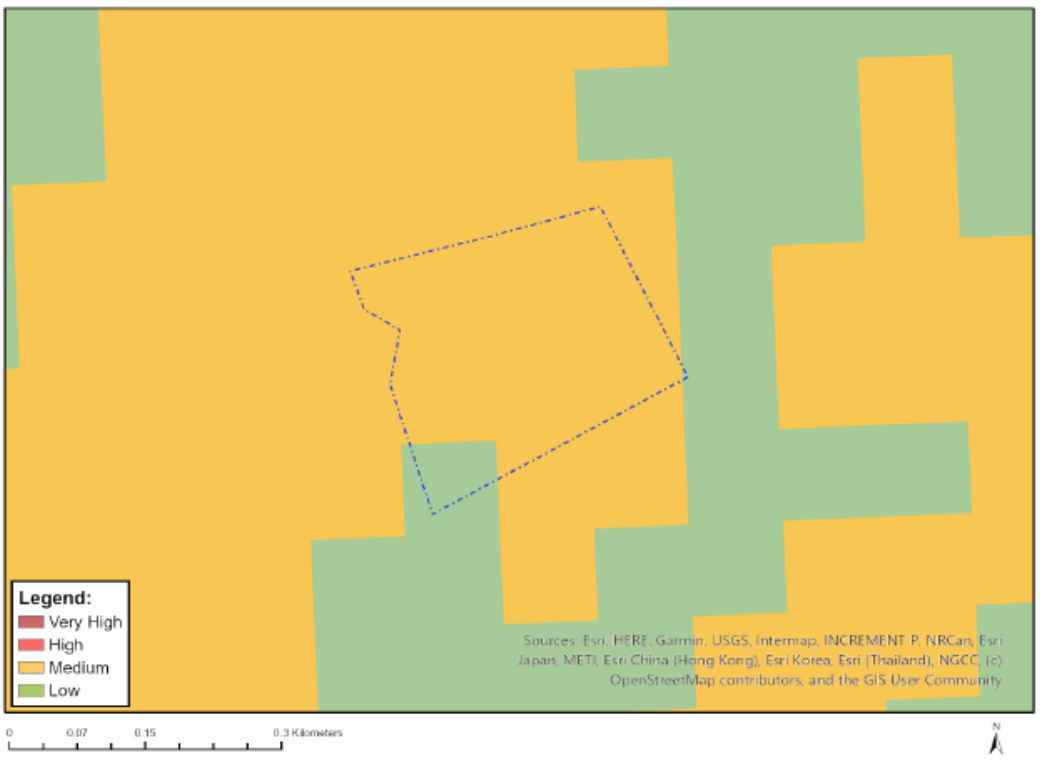
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

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

FIGURE 4: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR SITE BP3.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

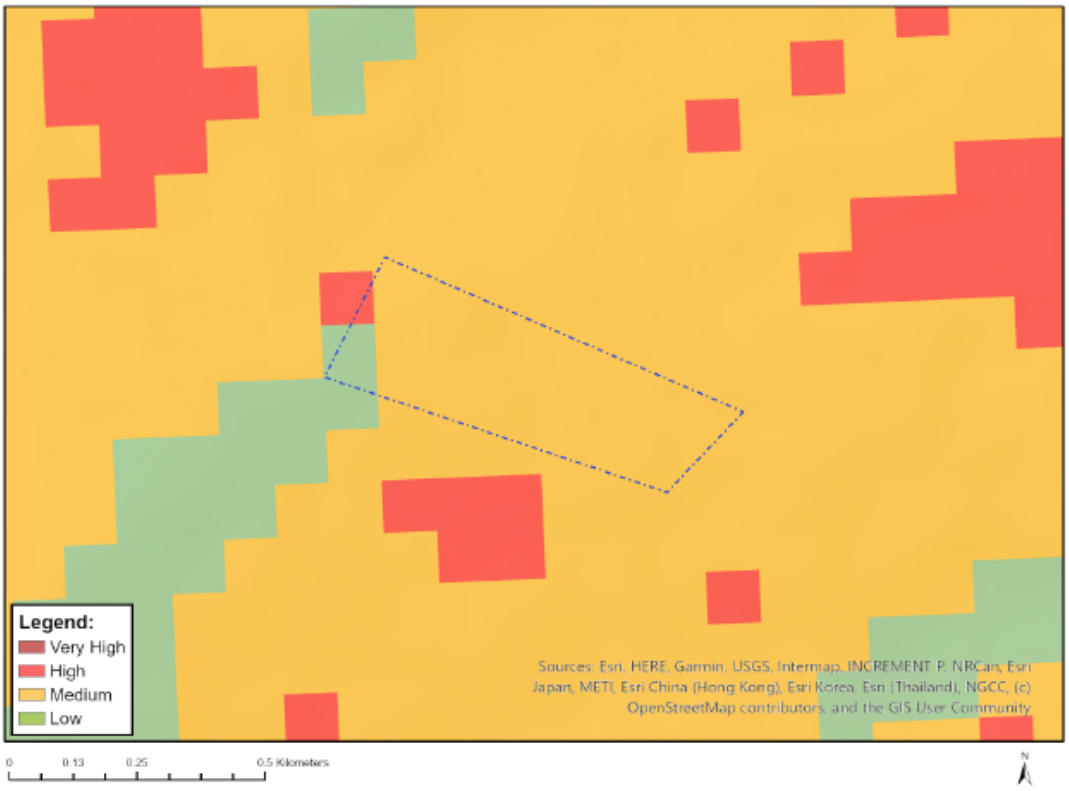


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
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 5: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR SITE BP4.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
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 6: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL FOR SITE BP5.

FIGURE 7: THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL.

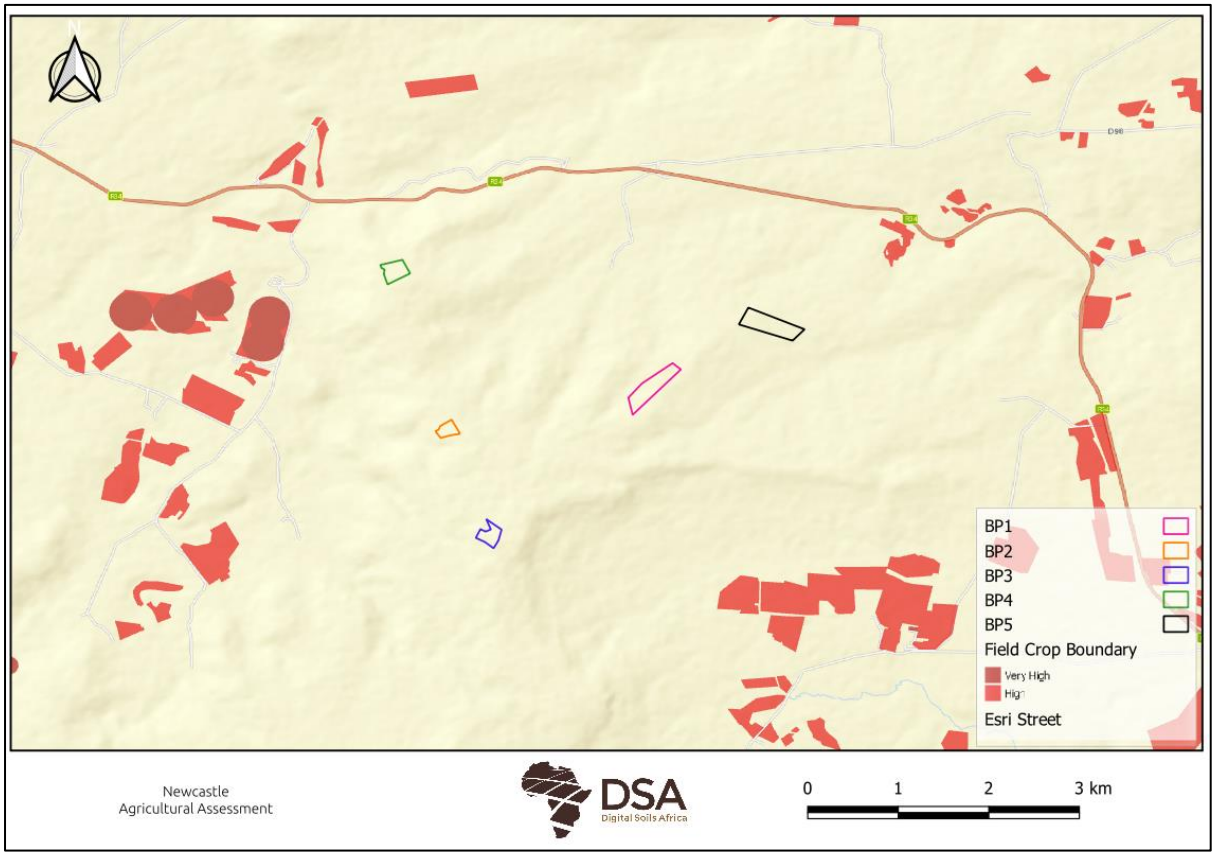


FIGURE 8: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL.

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 9).

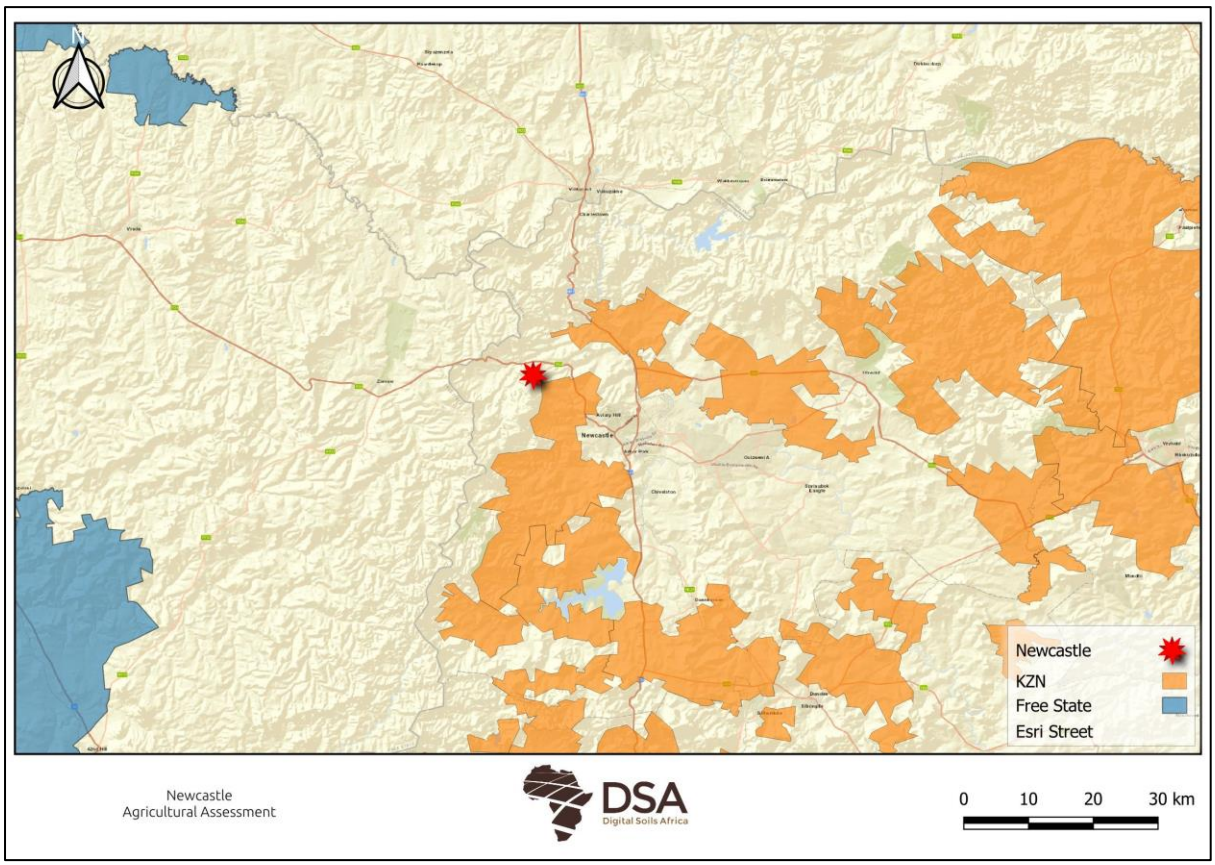


FIGURE 9: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

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. (**pg36**)
- 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(pg36);
- indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site (pg35).
- 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 (pg36);
- 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 (pg35);
- 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 (pg35);
- any conditions to which the statement is subjected (35);
- 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 (pg15).

ASSUMPTIONS AND GAPS

It is assumed that the data used in the desktop is correct, as no observations were made on site.

RESULTS

CLIMATE CAPABILITY

The site is considered to have a warm and temperate climate, and precipitation is more in summer and less in winter. According to Köppen and Geiger, this climate is classified as Cwb. The average annual temperature is 16.0°C and about 895 mm of precipitation falls annually. The site is located in a Humid zone (Figure 6).

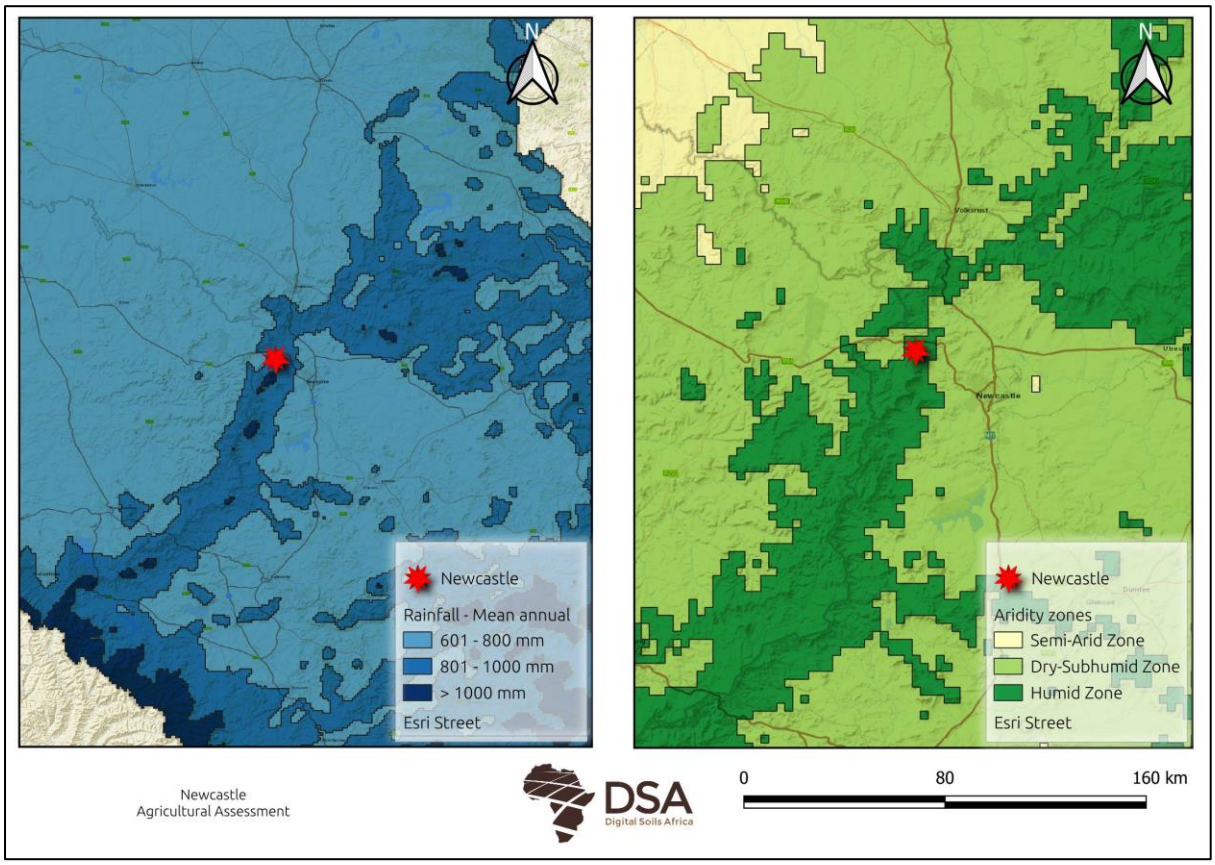


FIGURE 10: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

TABLE 1: CLIMATIC PROPERTIES OF NEWCASTLE, KWAZULU-NATAL (CLIMATE-DATA.ORG).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C	19.9 °C	19.8 °C	18.6 °C	15.9 °C	13.1 °C	10.3 °C	10.1 °C	13 °C	16 °C	17.5 °C	18.6 °C	19.7 °C
Min. Temperature °C	14.9 °C	14.9 °C	13.4 °C	10.4 °C	6.7 °C	3.7 °C	3.1 °C	5.6 °C	8.6 °C	11 °C	12.6 °C	14.3 °C
Max. Temperature °C	25.5 °C	25.5 °C	24.4 °C	22 °C	20.2 °C	17.9 °C	17.9 °C	21 °C	24 °C	24.8 °C	25.2 °C	25.8 °C
Precipitation / Rainfall mm	146	105	104	44	19	11	14	25	42	99	123	163
Humidity (%)	72%	71%	69%	66%	57%	53%	49%	45%	46%	58%	64%	69%
Rainy days (d)	13	10	9	6	3	2	2	3	5	10	12	14
avg. Sun hours (hours)	8.3	8.6	8.2	8.1	8.6	8.4	8.5	8.9	8.8	8.6	8.7	9.1

Climate capability is the 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 6 (Figure 11). This is considered a moderate to high capability.

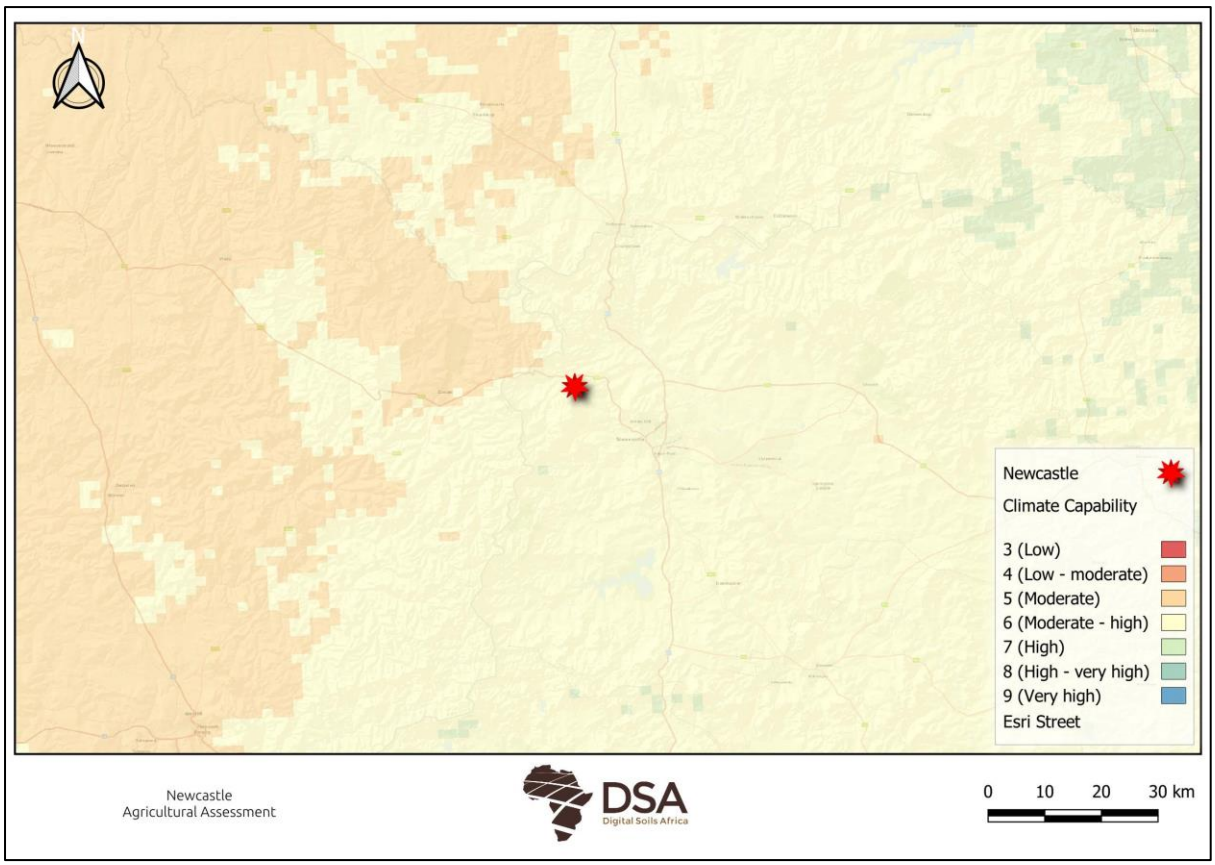


FIGURE 11: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 sites BP1, BP2, BP3, BP4 are comprised of land type Fa and study site BP5 is comprised of the Ea and Fa land types (Land Type Survey Staff, 1972 – 2002) (Figure 12). Ea land types are characterised by black or red clays which comprise >50% of land type. Fa land types is characterised by shallow soils (Mispah & Glenrosa forms), with little or no lime in the landscape.

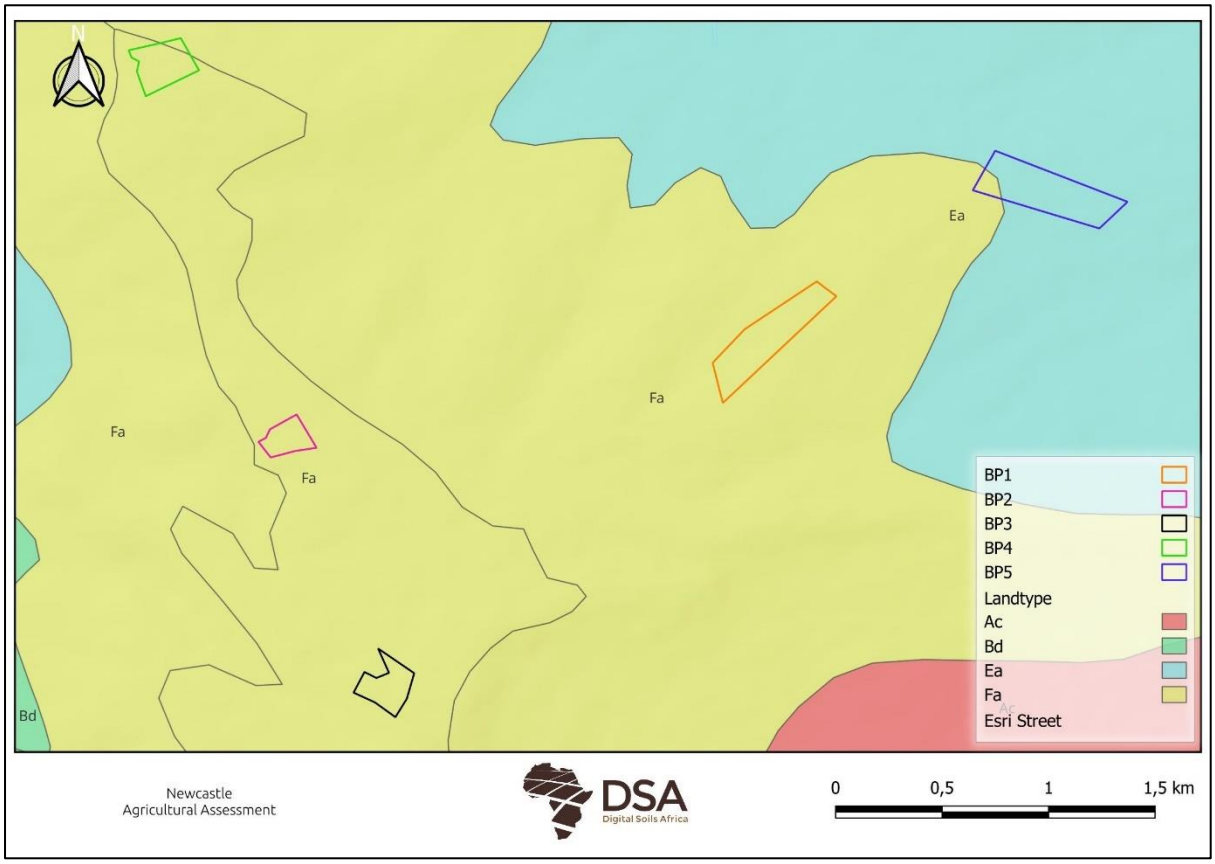


FIGURE 12: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

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), of site BP1 is a value of 5 (Moderate) (Figure 13), site BP2 (Figure 14) and BP3 (Figure 13) is a value of 4 (Low – moderate) , site BP4 is values of 4 (Low – moderate) and 5 (Moderate) (Figure 13) and site BP5 is values of 5 (Moderate) and 6 (Moderate – high) (Figure 13). This is considered a moderate to high soil capability.

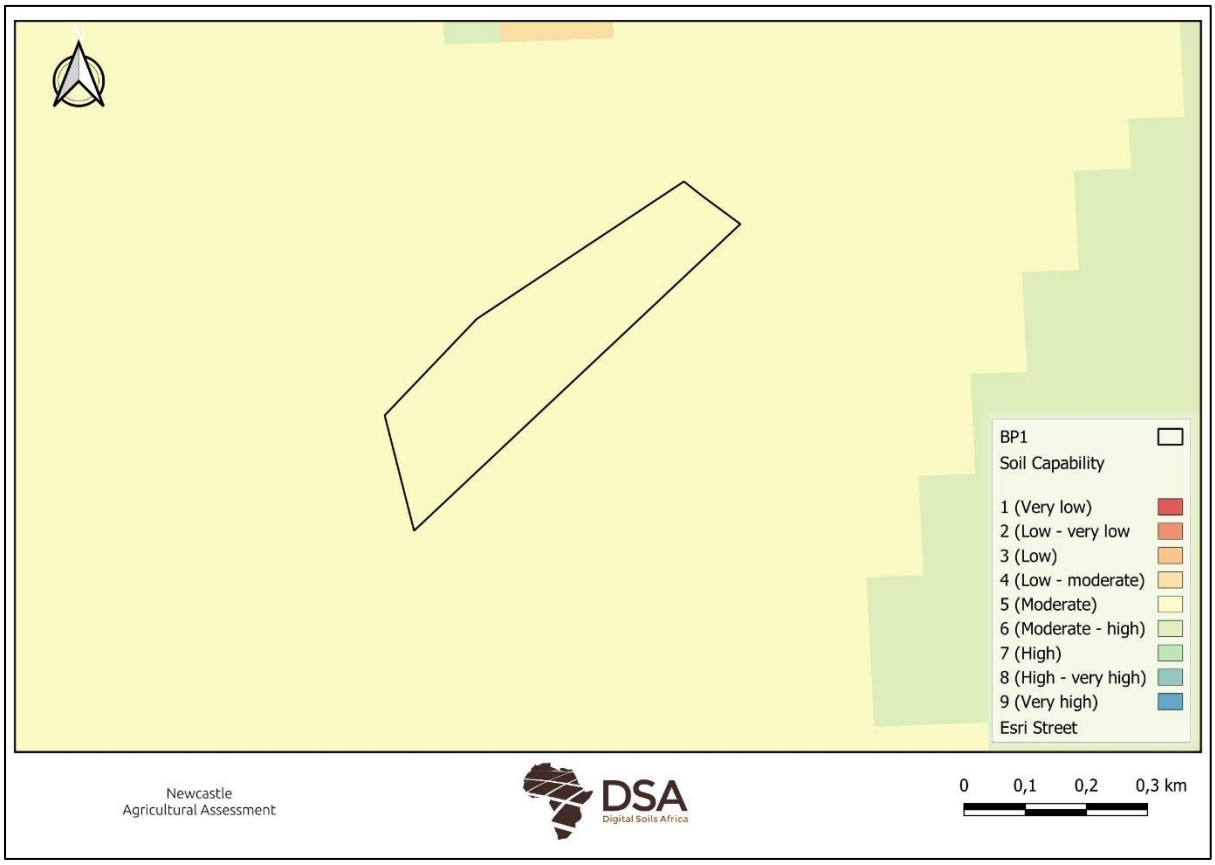


FIGURE 13: THE SOIL CAPABILITY OF THE SITE BP1 AND SURROUNDING AREA (DAFF, 2017).

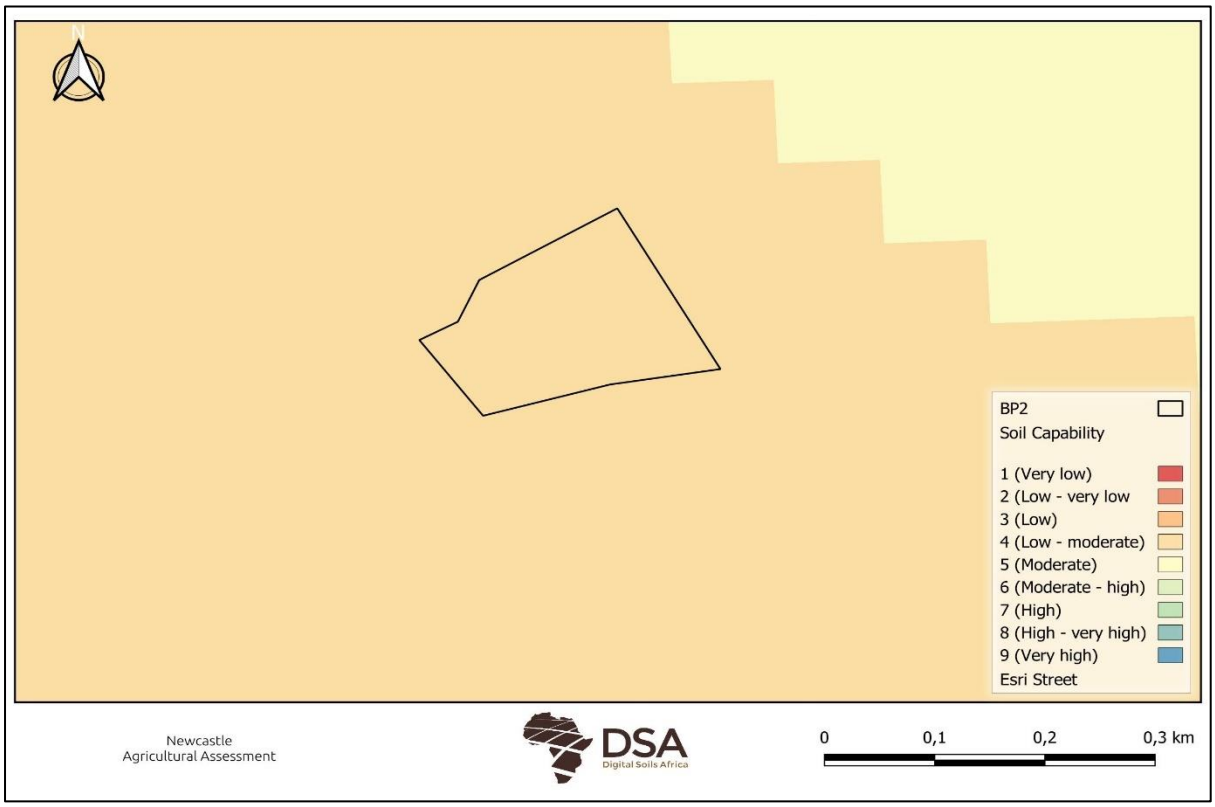


FIGURE 14: THE SOIL CAPABILITY OF THE SITE BP2 AND SURROUNDING AREA (DAFF, 2017).

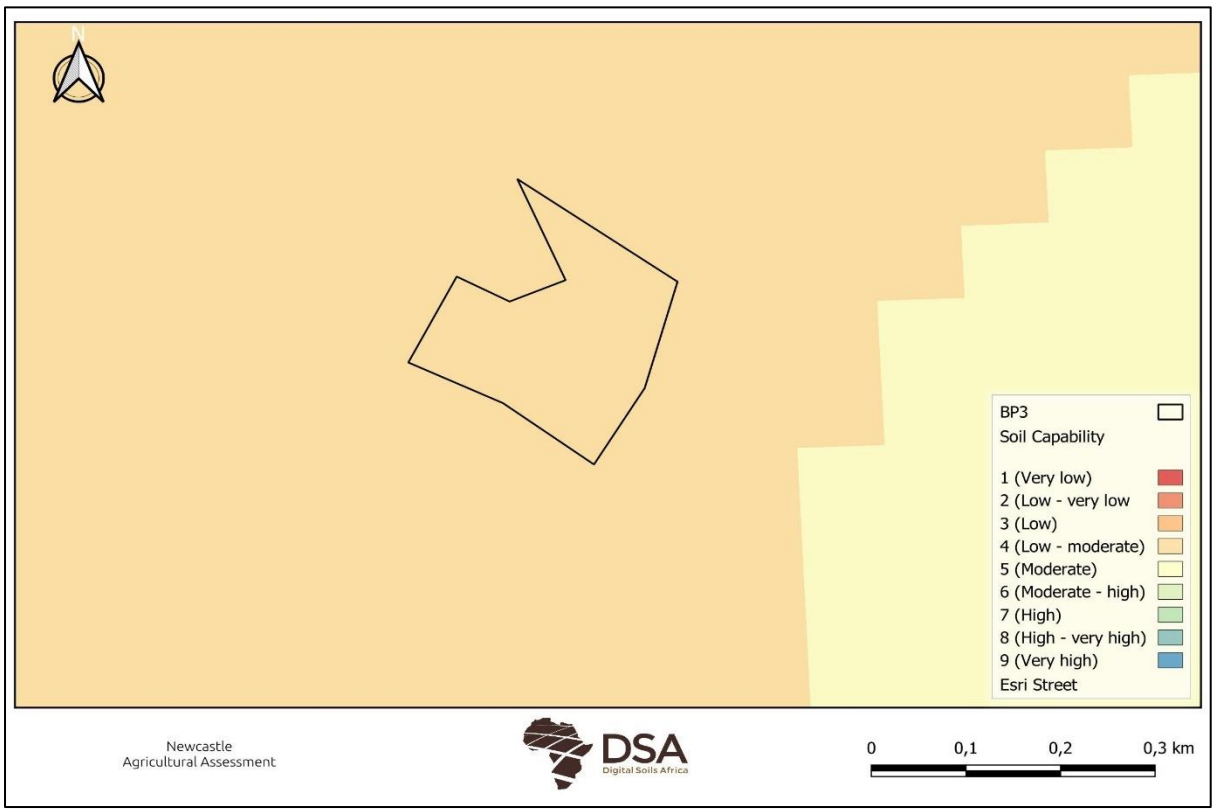


FIGURE 15: THE SOIL CAPABILITY OF THE SITE BP3 AND SURROUNDING AREA (DAFF, 2017).

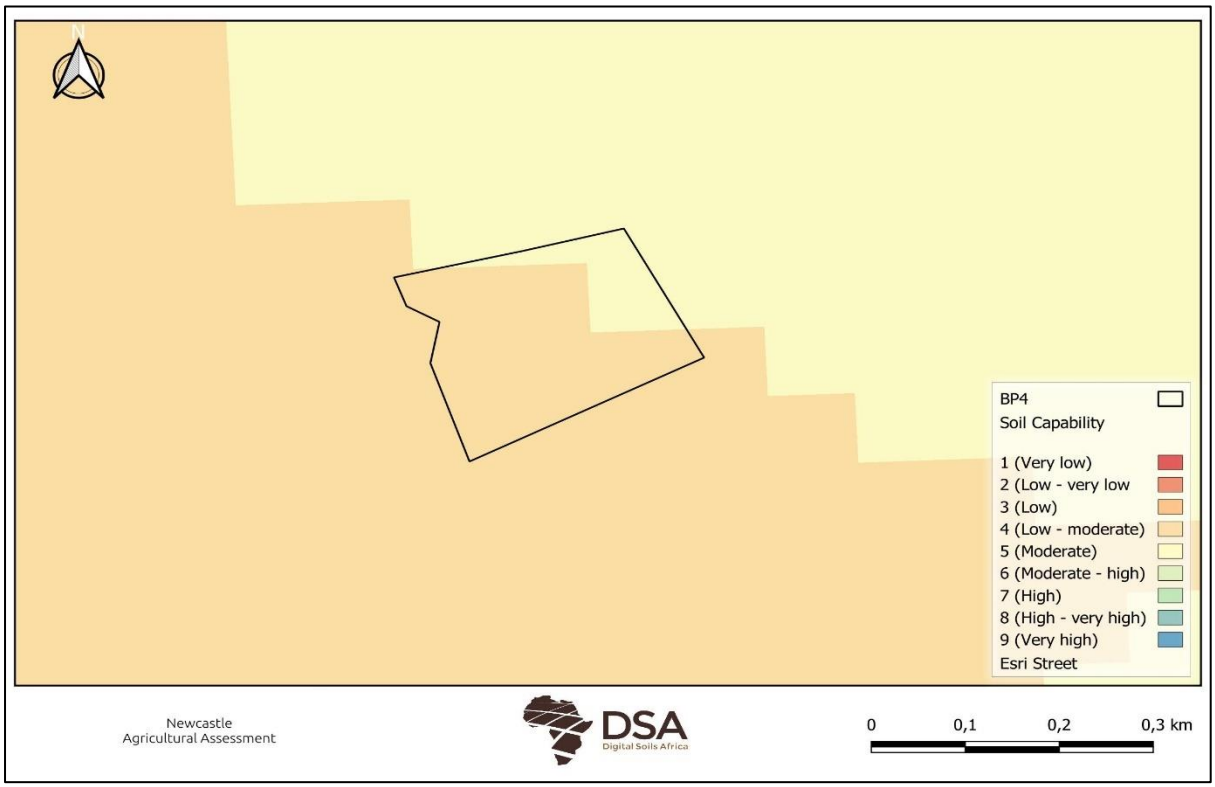


FIGURE 16: THE SOIL CAPABILITY OF THE SITE BP4 AND SURROUNDING AREA (DAFF, 2017).

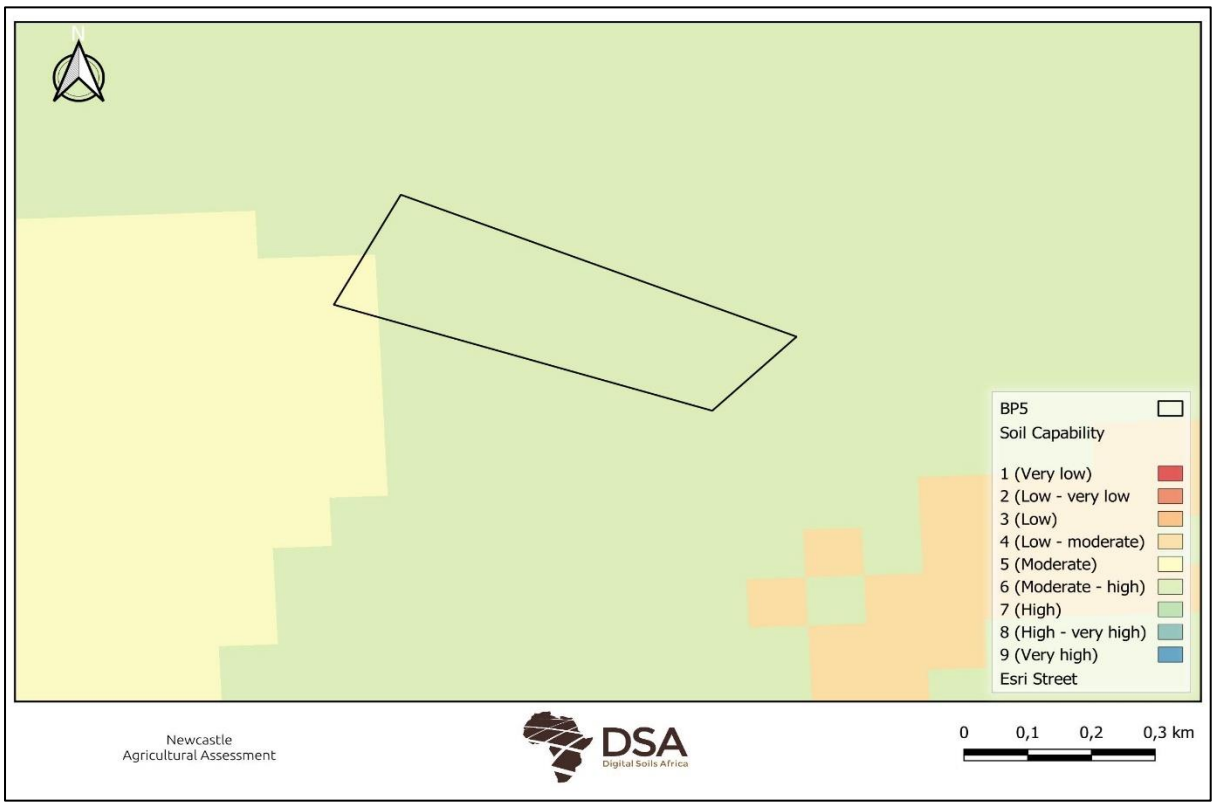


FIGURE 17: THE SOIL CAPABILITY OF THE SITE BP5 AND SURROUNDING AREA (DAFF, 2017).

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), of site BP1 is values of 3 (Low), 4 (Low – moderate), 5 (Moderate) and 6 (Moderate – high) (Figure 18). Terrain capability of site BP2 (Figure 19) and BP3 (Figure 20) is values of 4 (Low – moderate), 5 (Moderate) and 6 (Moderate – high), and terrain capability of sites BP4 (Figure 21) and BP5 is values of 3 (Low), 4 (Low – moderate), 5 (Moderate) and 6 (Moderate – high) (Figure 22).

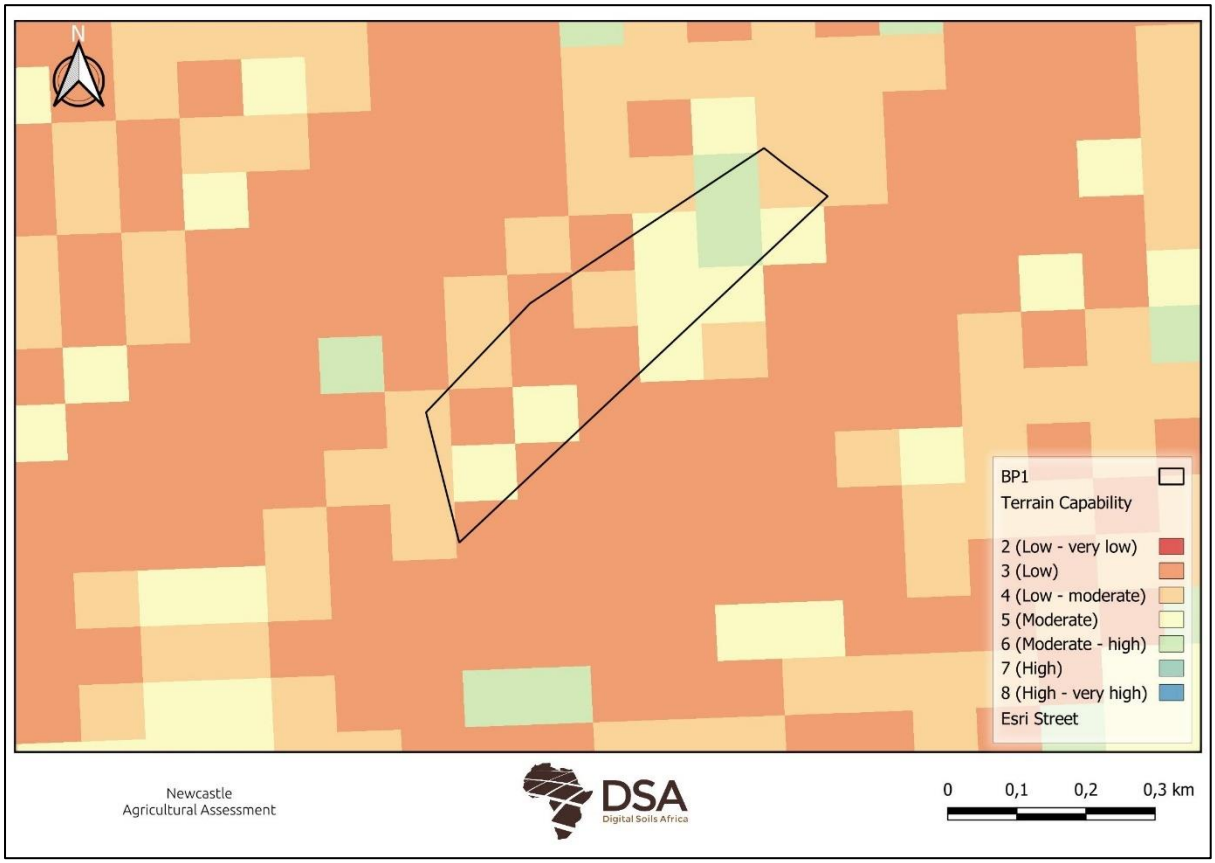


FIGURE 18: THE TERRAIN CAPABILITY OF THE SITE BP1 AND SURROUNDING AREA (DAFF, 2017).

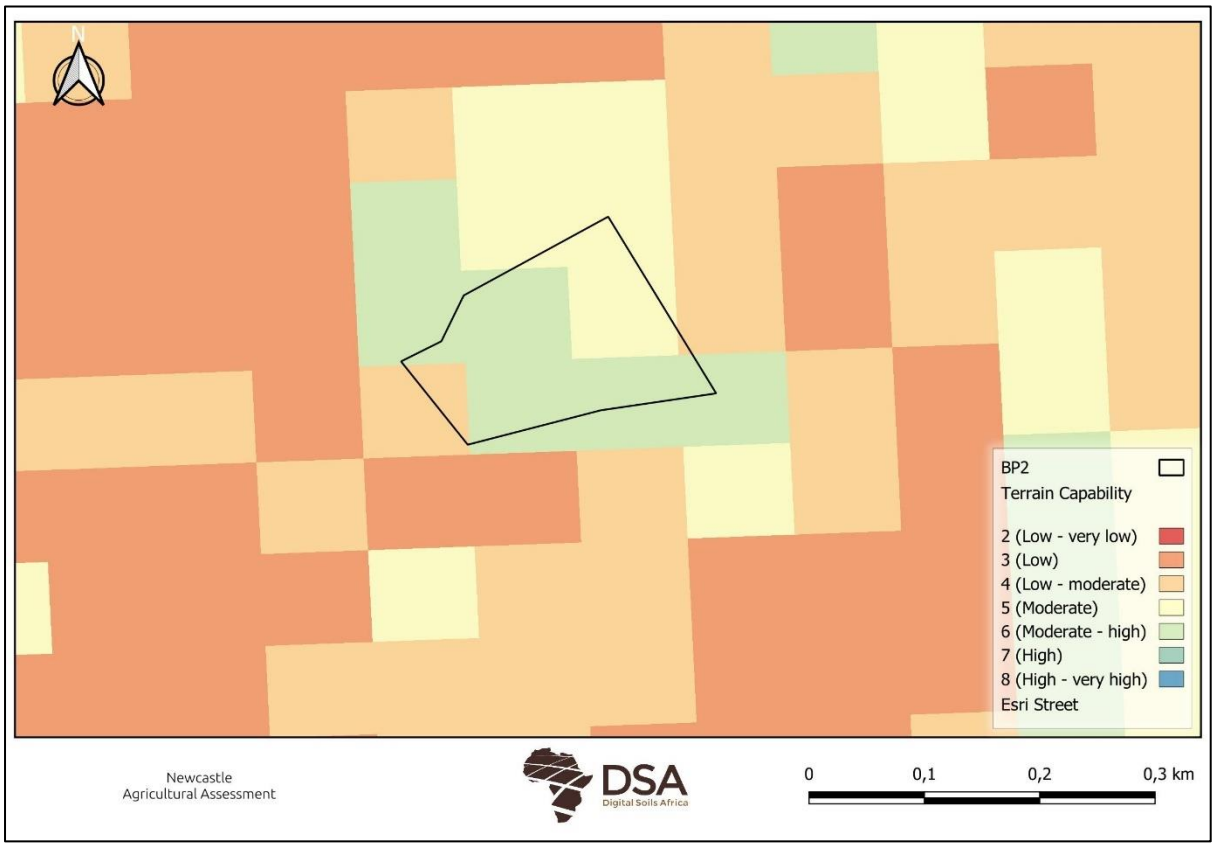


FIGURE 19: THE TERRAIN CAPABILITY OF THE SITE BP2 AND SURROUNDING AREA (DAFF, 2017).

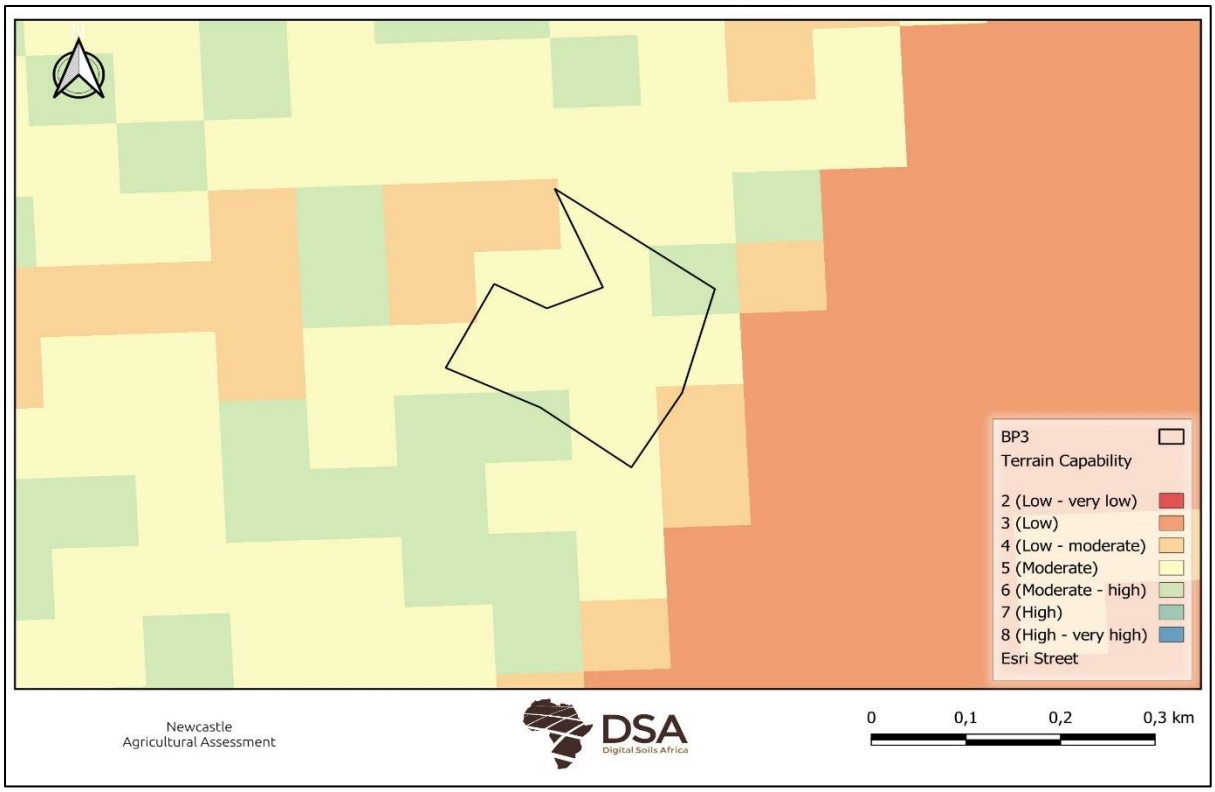


FIGURE 20: THE TERRAIN CAPABILITY OF THE SITE BP3 AND SURROUNDING AREA (DAFF, 2017).

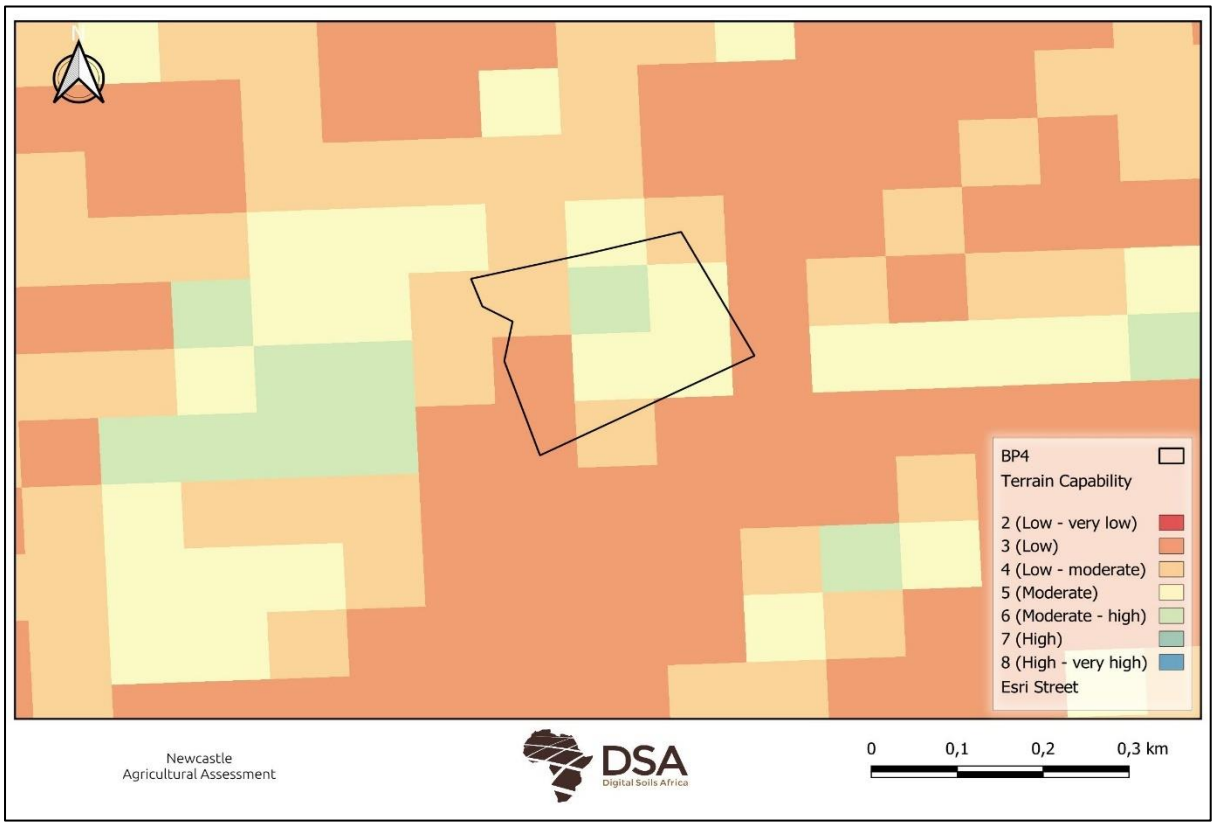


FIGURE 21: THE TERRAIN CAPABILITY OF THE SITE BP4 AND SURROUNDING AREA (DAFF, 2017).

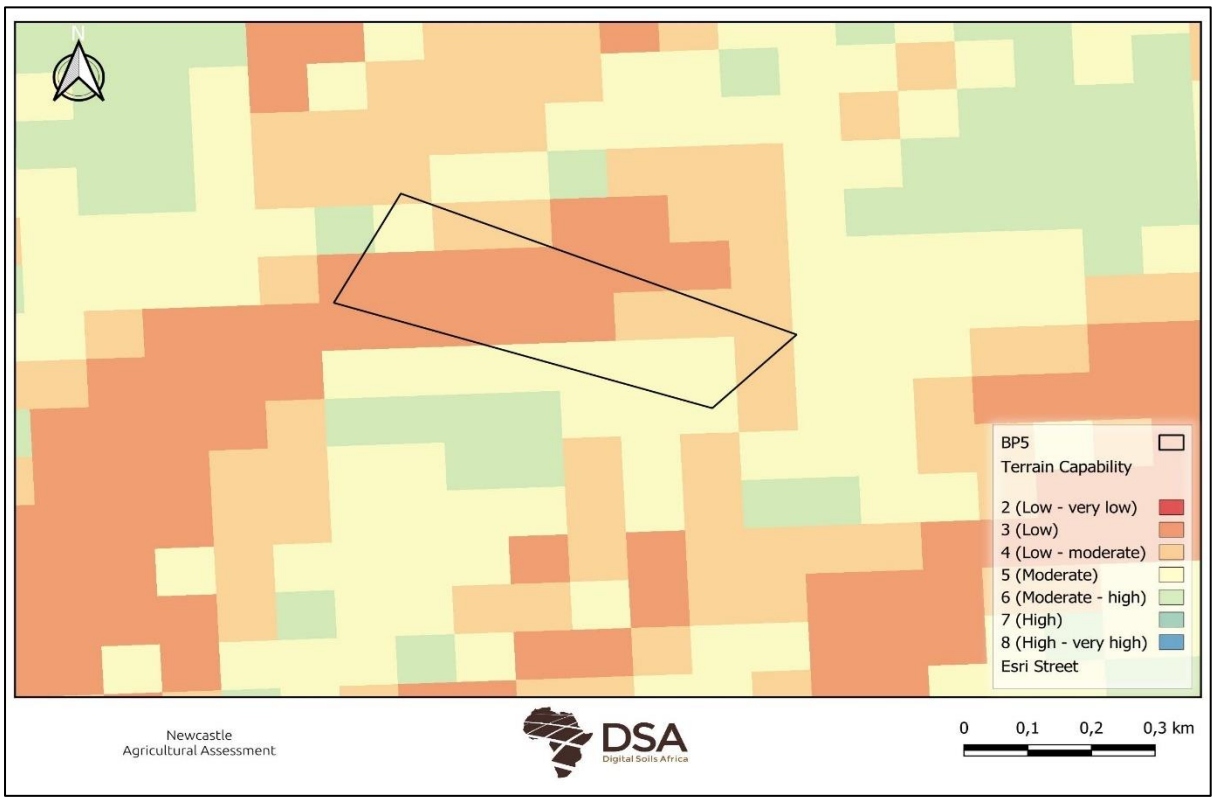


FIGURE 22: THE TERRAIN CAPABILITY OF THE SITE BP5 AND SURROUNDING AREA (DAFF, 2017).

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	Not arable
3-4	Very Low to Low	
5	Low	
6-7	Low to Moderate	
8	Moderate	Arable
9-10	Moderate to High	
11	High	
12-13	High to Very High	
14-15	Very High	

The Land capability of site BP1 is values of 3 (Very low – Low), 4 (Very low – Low), 5 (Low), 6 (Low – moderate), 7 (Low – moderate) and 8 (Moderate) which is generally considered not arable (Figure 23). The Land capability of sites BP2 (Figure 23) and BP3 (Figure 23) is values of 7 (Low – moderate) and 8 (Moderate). The Land capability of site BP4 is values of 5 (Low), 6 (Low – moderate), 7 (Low – moderate) and 8 (Moderate) (Figure 23) and land capability of site BP5 is values of 5 (Low), 6 (Low – moderate), 7 (Low – moderate), 8 (Moderate) and 9 (Moderate – high) which is generally considered arable soils (Figure 23).

FIGURE 23: LAND CAPABILITY CLASS MAP OF THE STUDY AREA BP1 (DAFF, 2017).

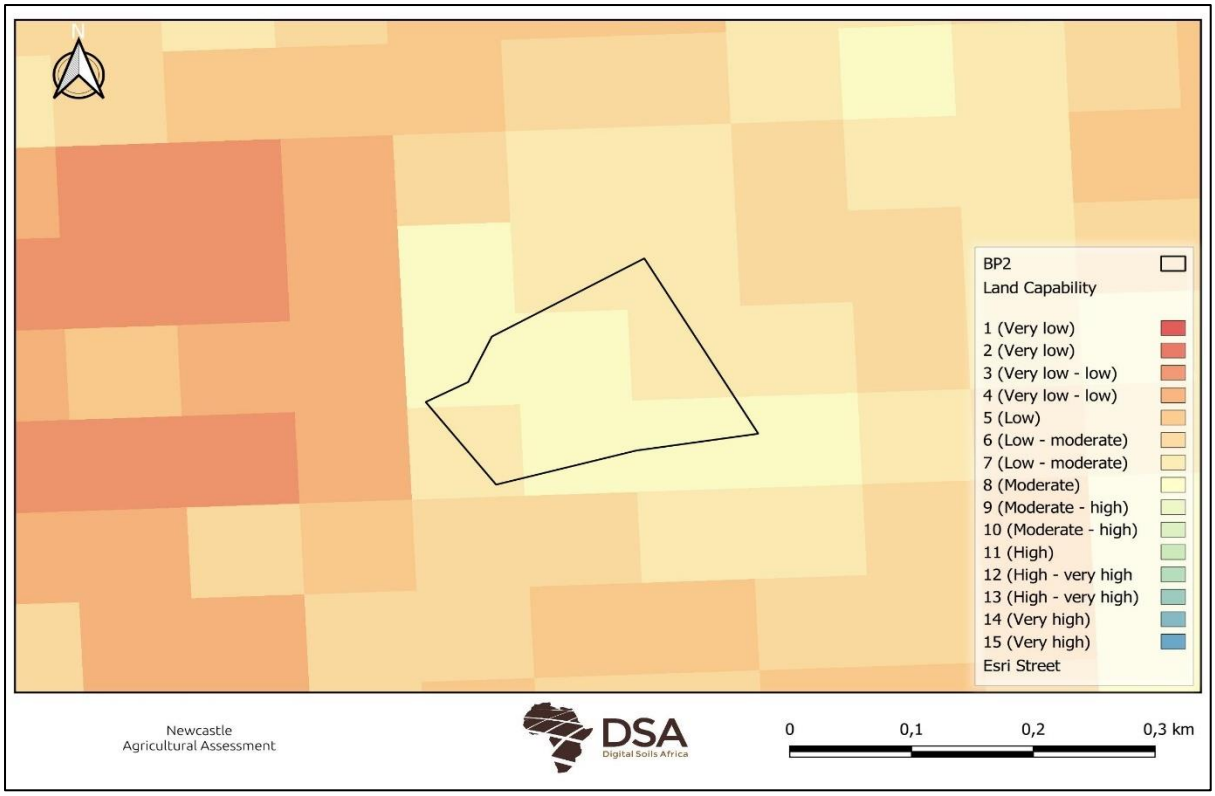


FIGURE 24: LAND CAPABILITY CLASS MAP OF THE STUDY AREA BP2 (DAFF, 2017).

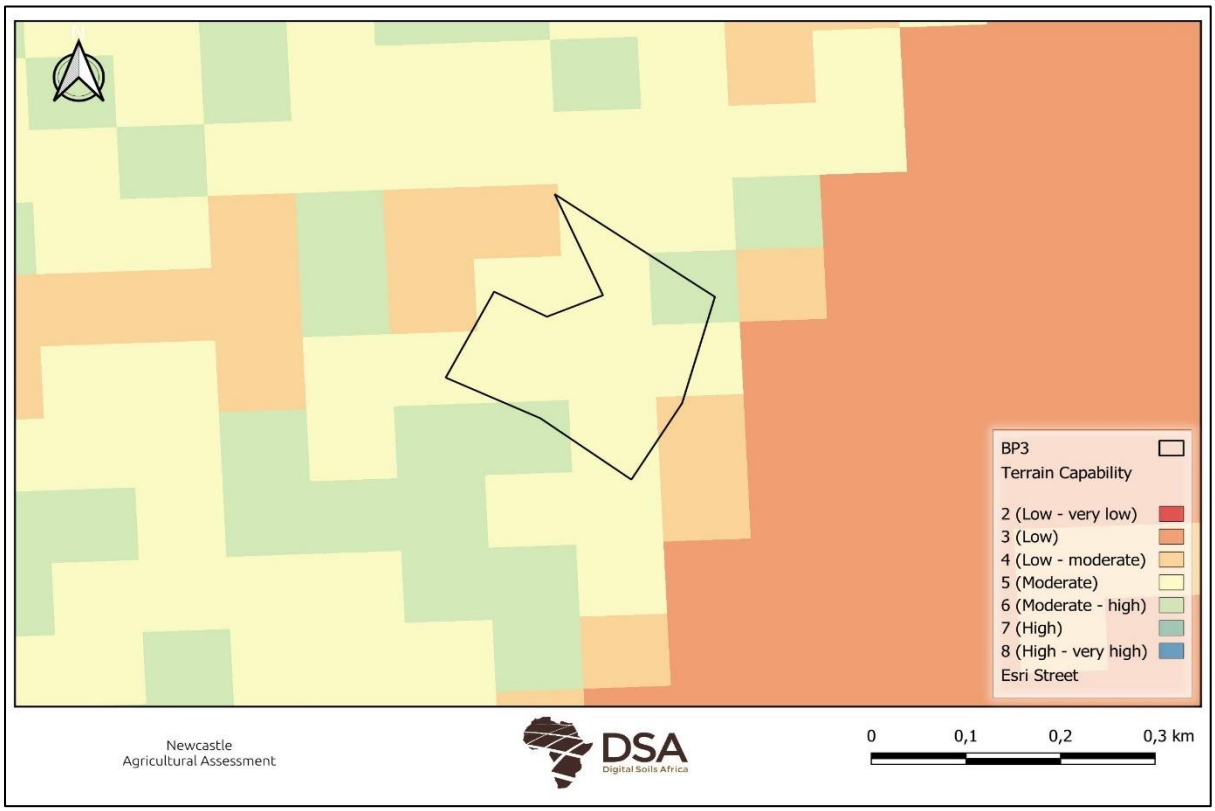


FIGURE 25: LAND CAPABILITY CLASS MAP OF THE STUDY AREA BP3 (DAFF, 2017).

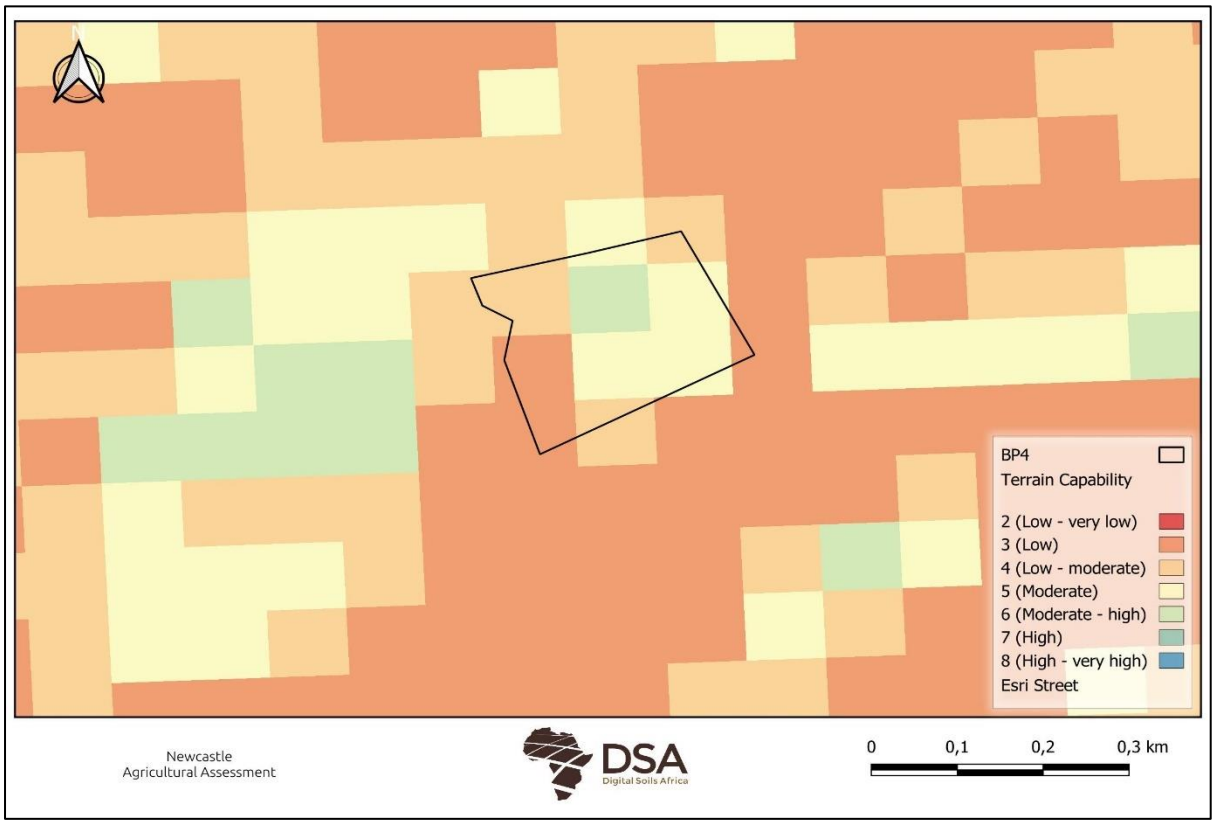


FIGURE 26: LAND CAPABILITY CLASS MAP OF THE STUDY AREA BP4 (DAFF, 2017).

FIGURE 27: LAND CAPABILITY CLASS MAP OF THE STUDY AREA BP5 (DAFF, 2017).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). Site BP1, BP2, BP3 and BP4 have a very high grazing capacity of 3 ha/LSU and site BP5 has a very high grazing capacity of 3 and 3.5 ha/LSU (Figure 28). 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).

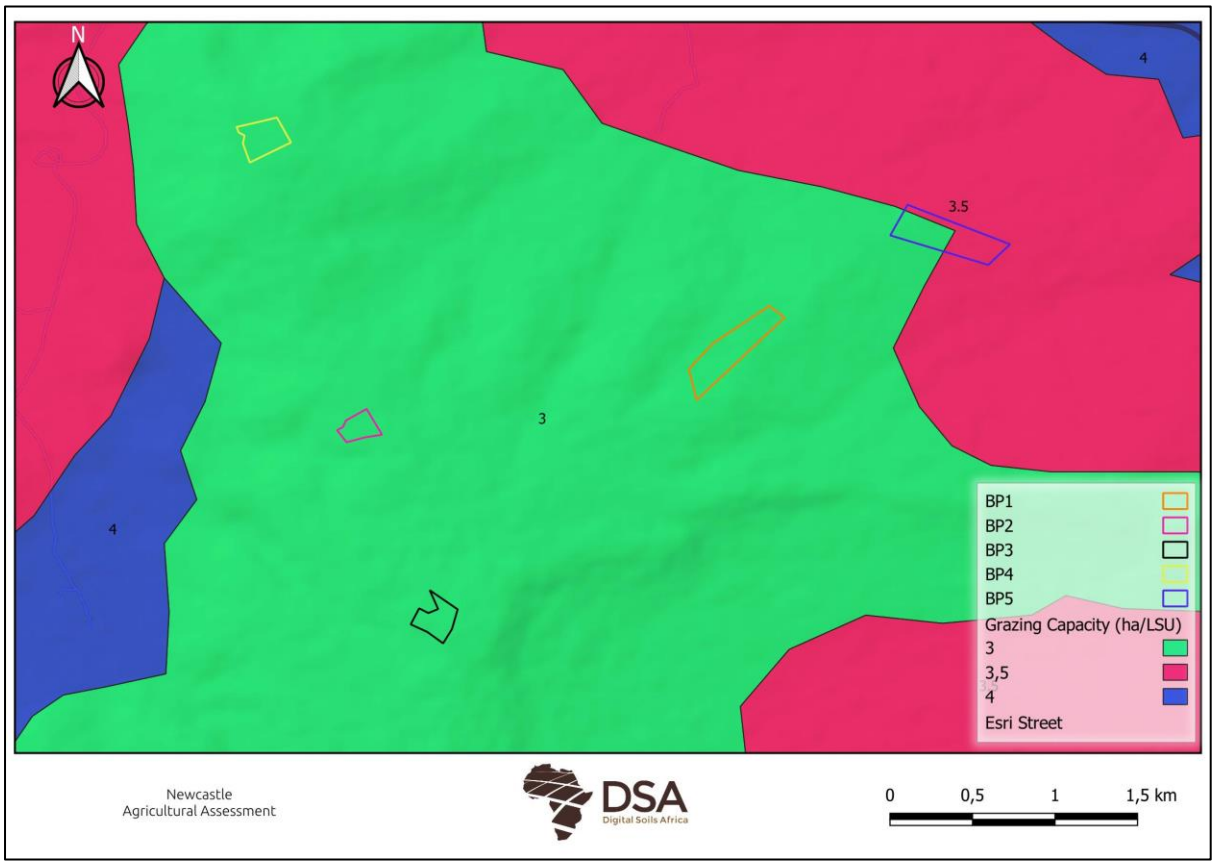


FIGURE 28: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

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. The SANLC 2020 classifies the site as 3 (Dense Forest & Woodland) and 13 (Natural Grassland (Figure 29) with the class names listed in the TABLE 3 below.

TABLE 3: LEGEND TO Figure 29.

No.	Class Name	Class Definition
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.

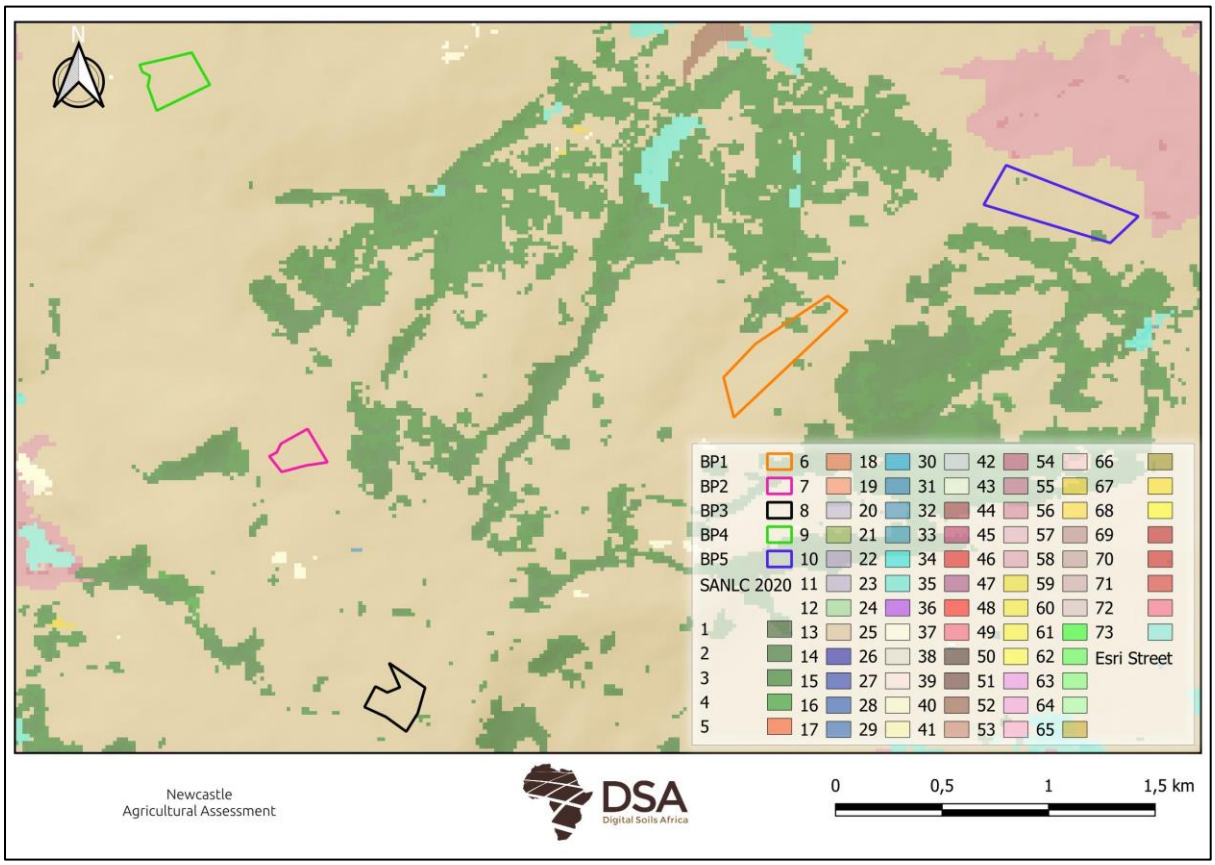


FIGURE 29: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020).

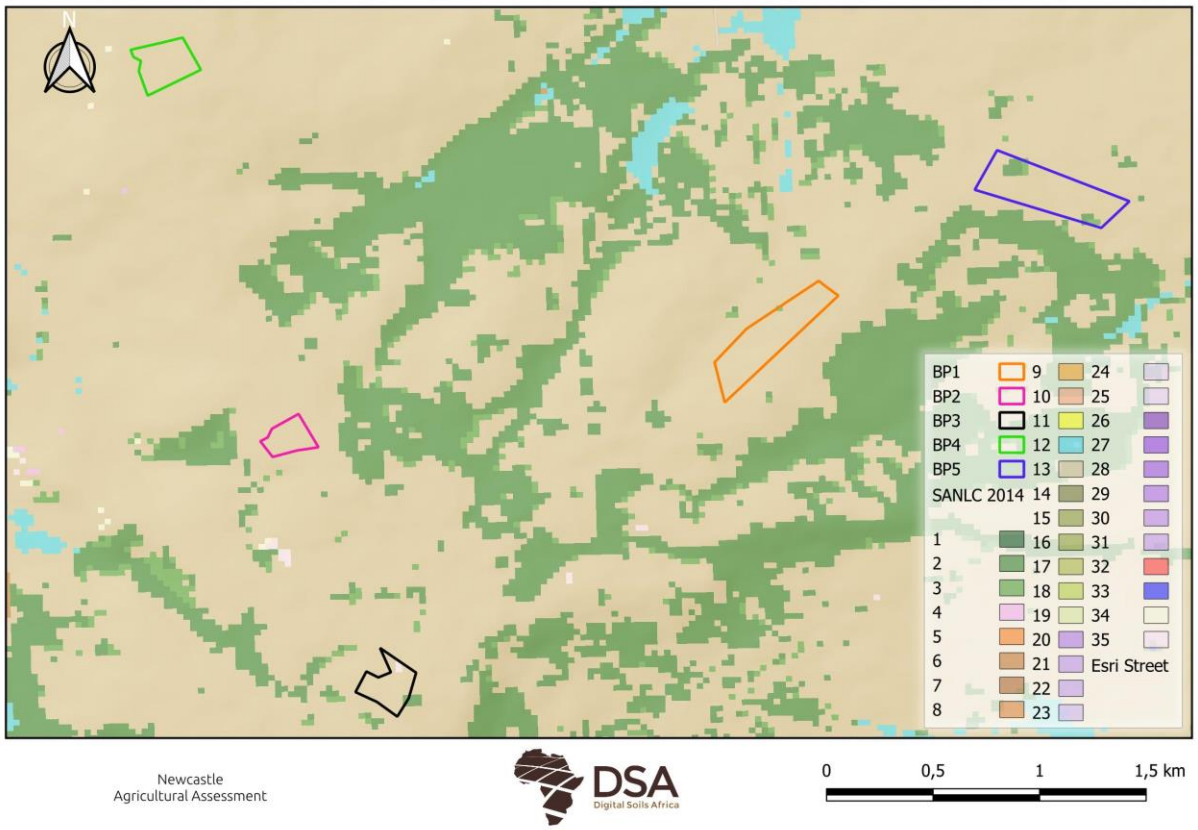


FIGURE 30: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014).

The Google satellite images suggest that the landuse of the study site and the surounding development site has not changed much (2014 – 2024) (Figure 32 to Figure 17).

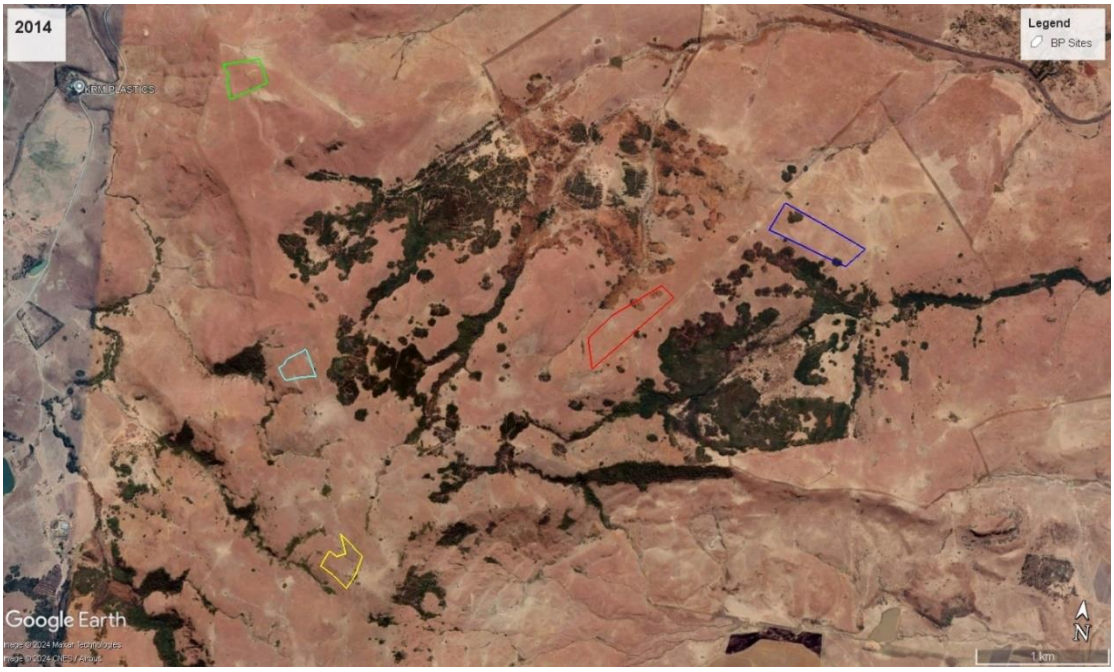


FIGURE 31: GOOGLE SATELLITE IMAGE OF NEWCASTLE SITE (2014).

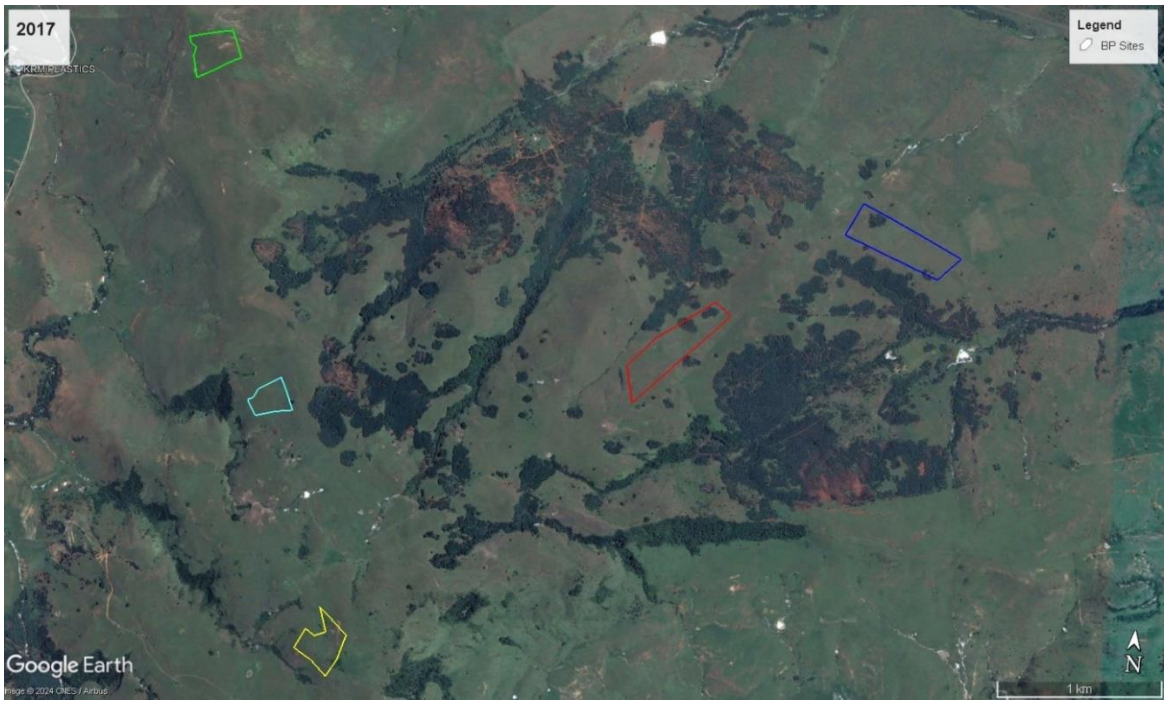


FIGURE 32: GOOGLE SATELLITE IMAGE OF NEWCASTLE SITE (2017).

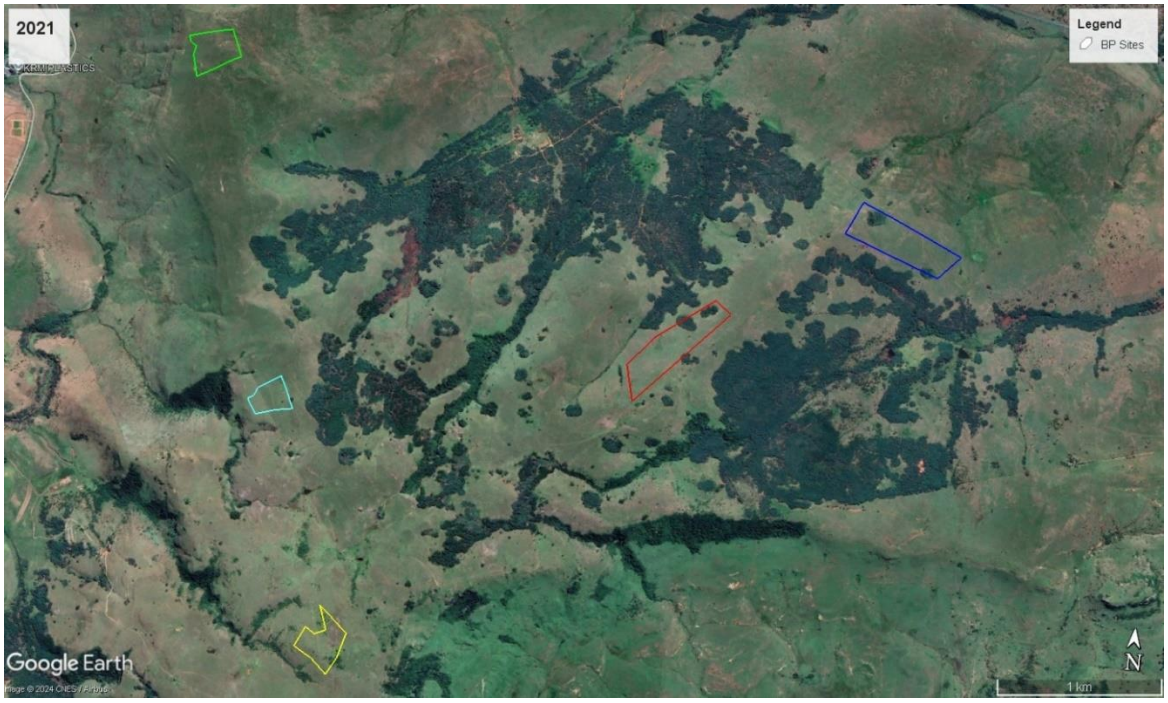


FIGURE 33: GOOGLE SATELLITE IMAGE OF NEWCASTLE SITE (2021).

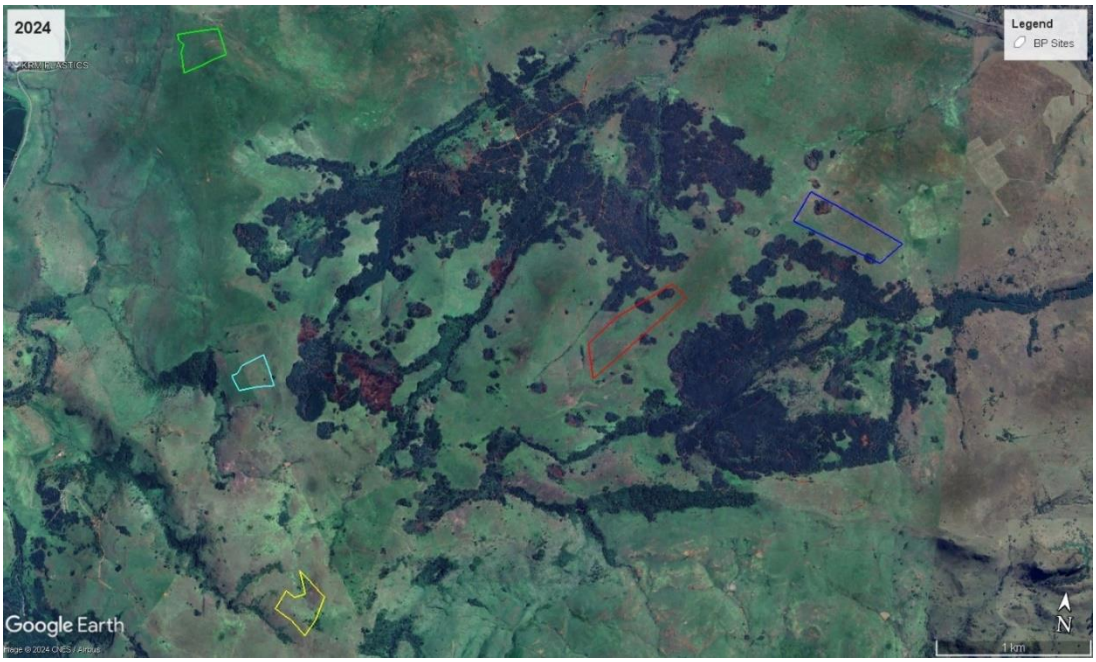


FIGURE 34: GOOGLE SATELLITE IMAGE OF NEWCASTLE SITES (2024).

FIGURE 35: PHOTOGRAPHS OF THE SITES.

COMPLIANCE STATEMENT

This Agricultural Compliance Statements below conform with the Environmental Authorization requirements stipulated by the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA").

BP1

The Environmental Screening Report (ESR) generated through the National Web-based Screening Tool identifies the agricultural sensitivity as medium agricultural sensitivity.

Findings from the desktop assessment:

- The study area is not situated within a Protected Agricultural Area.
- No field crop boundaries were recorded in SANLC 2014 and 2020, no agricultural activities were observed from the Google satellite images or photos.
- The climate capability of the area was classified as moderate to high.
- Fa land types are characterised by shallow soils (Mispah & Glenrosa forms), with little or no lime in the landscape. The soil capability was classified as moderate for site BF1,
- Due to the topography, the sites terrain capability ranges from low to high.
- The overall land capability for all the sites was as considered not arable or marginal.
- The grazing capacity of sites was very high (3 ha/LSU).

The desktop assessment for BP1 supports the medium sensitivity of the screening tool. It is the specialist's opinion that the development continues. The development will not have a significant impact on potential agricultural activities in the area and pose no threat to food security.

BP2

The Environmental Screening Report (ESR) generated through the National Web-based Screening Tool identifies the agricultural sensitivity as medium agricultural sensitivity.

Findings from the desktop assessment:

- The study area is not situated within a Protected Agricultural Area.
- No field crop boundaries were recorded in SANLC 2014 and 2020, no agricultural activities were observed from the Google satellite images or photos.
- The climate capability of the area was classified as moderate to high.
- Fa land types are characterised by shallow soils (Mispah & Glenrosa forms), with little or no lime in the landscape. The soil capability was classified as moderate for site BF1,
- Due to the topography, the sites terrain capability ranges from low to high.
- The overall land capability for all the sites was as considered not arable or marginal.

- The grazing capacity of sites was very high (3 ha/LSU).

The desktop assessment for BP2 supports the medium sensitivity of the screening tool. It is the specialist's opinion that the development continues. The development will not have a significant impact on potential agricultural activities in the area and pose no threat to food security.

BP3

The Environmental Screening Report (ESR) generated through the National Web-based Screening Tool identifies the agricultural sensitivity as medium agricultural sensitivity.

Findings from the desktop assessment:

- The study area is not situated within a Protected Agricultural Area.
- No field crop boundaries were recorded in SANLC 2014 and 2020, no agricultural activities were observed from the Google satellite images or photos.
- The climate capability of the area was classified as moderate to high.
- Fa land types are characterised by shallow soils (Mispah & Glenrosa forms), with little or no lime in the landscape. The soil capability was classified as moderate for site BF1,
- Due to the topography, the sites terrain capability ranges from low to high.
- The overall land capability for all the sites was as considered not arable or marginal.
- The grazing capacity of sites was very high (3 ha/LSU).

The desktop assessment for BP3 supports the medium sensitivity of the screening tool. It is the specialist's opinion that the development continues. The development will not have a significant impact on potential agricultural activities in the area and pose no threat to food security.

BP4

The Environmental Screening Report (ESR) generated through the National Web-based Screening Tool identifies the agricultural sensitivity as medium agricultural sensitivity.

Findings from the desktop assessment:

- The study area is not situated within a Protected Agricultural Area.
- No field crop boundaries were recorded in SANLC 2014 and 2020, no agricultural activities were observed from the Google satellite images or photos.
- The climate capability of the area was classified as moderate to high.
- Fa land types are characterised by shallow soils (Mispah & Glenrosa forms), with little or no lime in the landscape. The soil capability was classified as moderate for site BF1,
- Due to the topography, the sites terrain capability ranges from low to high.
- The overall land capability for all the sites was as considered not arable or marginal.

- The grazing capacity of sites was very high (3 ha/LSU).

The desktop assessment for BP4 supports the medium sensitivity of the screening tool. It is the specialist's opinion that the development continues. The development will not have a significant impact on potential agricultural activities in the area and pose no threat to food security.

BP5

The Environmental Screening Report (ESR) generated through the National Web-based Screening Tool identifies the agricultural sensitivity of sites BP1, BP2, BP3 and BP4 as medium agricultural sensitivity and site BP5 as high agricultural sensitivity.

Findings from the desktop assessment:

- The study area is not situated within a Protected Agricultural Area.
- No field crop boundaries were recorded in SANLC 2014 and 2020, no agricultural activities were observed from the Google satellite images or photos.
- The climate capability of the area was classified as moderate to high.
- Ea land types are characterised by black or red clays which comprise >50% of land type. The soil capability was classified as moderate to high for site BP5
- The sites had a low to high terrain capability.
- The overall land capability for all the sites was as considered not arable and arable.
- The grazing capacity of sites was very high (3 – 3.5 ha/LSU)

The desktop assessment for BP5 slightly differs from the high sensitivity indicated by the screening tool. Ea land types are not associated with high productivity; instead, their high clay content presents significant challenges. Furthermore, only one pixel (30 x 30 m) is classified as high sensitivity in the screening tool. Therefore, it is recommended that BP5 be reclassified as medium sensitivity.

In the specialist's opinion, the development should proceed. The development will not have a significant impact on potential agricultural activities in the area and poses no threat to food security.

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