COMPLIANCE STATMENT FOR CARNARVON SKA, NORTHERN CAPE

PREPARED FOR

ENVIROAFRICA

JULY 2024

DSA
Digital Soils Africa

+27 83 703 3002
www.dsafrica.co.za
darren@dsafrica.co.za
Kemsley Street
Port Elizabeth

TABLE OF CONTENTS

Background to the study 4

Environmental Screening Tool 5

Assumptions and Gaps 9

Results 10

Climate Capability 10

Soil 13

Landtype 13

Soil Capability 14

Terrain Capability 15

Land Capability 16

Grazing Capacity 17

Land use 19

Compliance Statement 23

Appendix 1: Specialist CV 24

Specialist declaration 25

List of Figures

Figure 1: Location of the study area in the Northern Cape province. 4

Figure 2: Results from the Environmental screening tool. 6

Figure 3: The land capability of the study as used in the screening tool. 7

Figure 4: The field crop boundaries as used in the screening tool. 7

Figure 5: The Protected Agricultural Areas for the study area. 8

Figure 6: Climate of the site and the surrounding area (Schulze, 2007). 10

Figure 7: The Climate capability of the site and surrounding area (DAFF, 2017). 12

Figure 8: Landtypes found in the study area and the surrounding area (Land Type Survey Staff, 1972 – 2002). 13

Figure 9: The Soil capability of the site and surrounding area (DAFF, 2017). 14

Figure 10: The Terrain capability of the site and surrounding area (DAFF, 2017). 15

Figure 11: Land capability class map of the study area (DAFF, 2017). 17

Figure 12: Grazing capacity for the site and the surrounding area (Department of Agriculture, Forestry and Fisheries, 2016). 18

Figure 13: South African National Land-Cover 2020 (SANLC 2020). 20

Figure 14: South African National Land-Cover 2014 (SANLC 2014). 20

Figure 15: Google satellite image of the Carnarvon development site (2014). 21

Figure 16: Google satellite image of the Carnarvon development site (2018). 21

Figure 17: Google satellite image of the Carnarvon development site (2023). 22

BACKGROUND TO THE STUDY

Digital Soils Africa (Pty) LTD (DSA) were tasked by EnviroAfrica, 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 Low sensitivity for the Agricultural theme.

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 site is located in Carnarvon, in Pixley ka Seme District Municipality of Northern Cape province, South Africa. It is located to the west of the Carnarvon CBD and can be accessed via End Street (Figure 1).

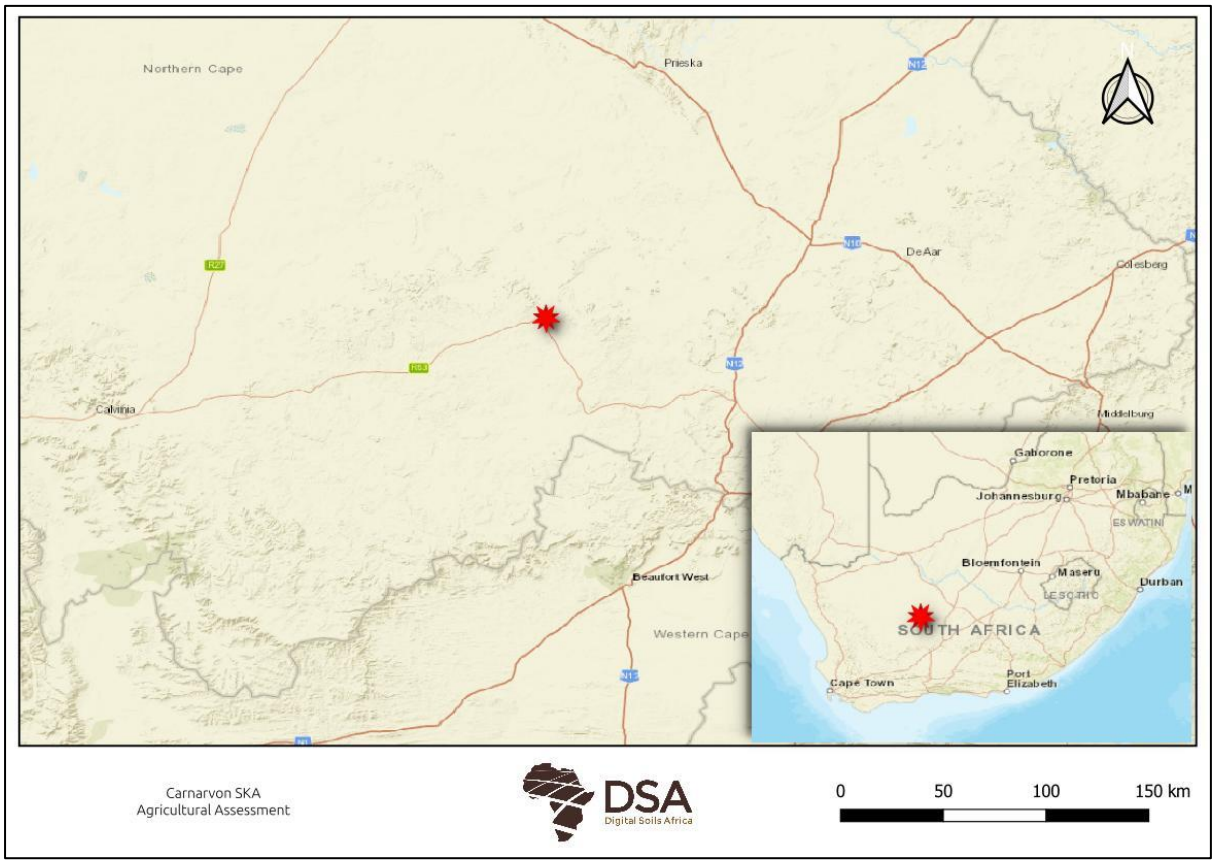


FIGURE 1: LOCATION OF THE STUDY AREA IN THE NORTHERN CAPE PROVINCE.

ENVIRONMENTAL SCREENING TOOL

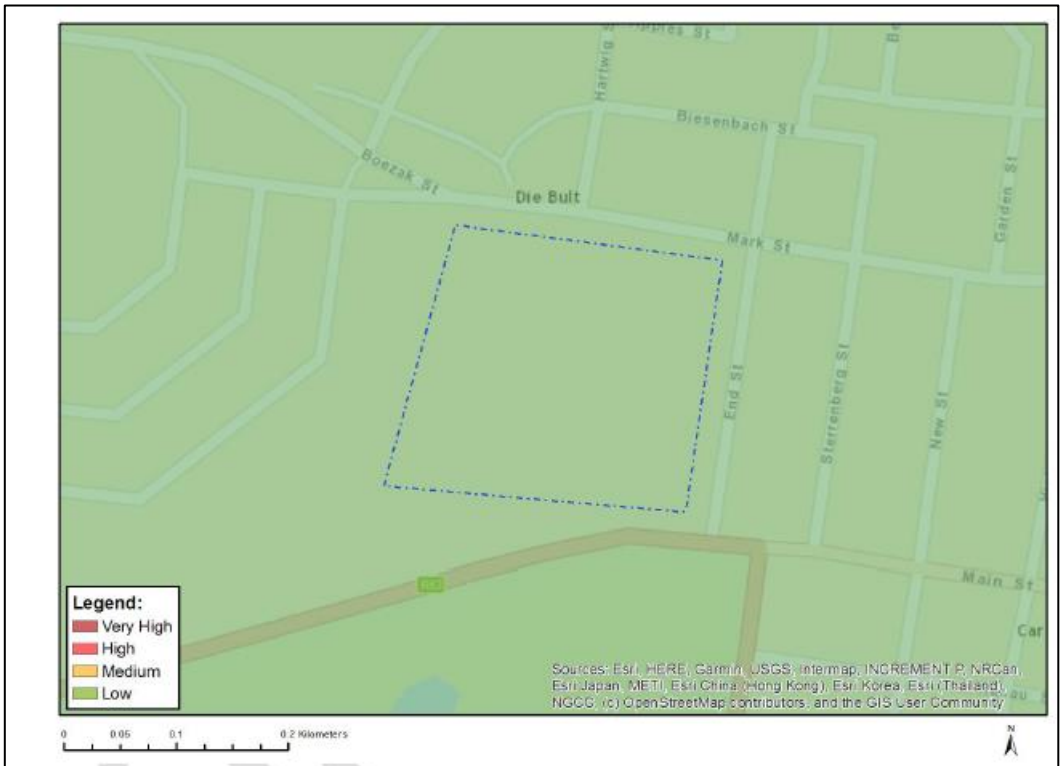
Agricultural sensitivity, as reported in the screening tool, is based upon the land use (SANLC, 2014) and land capability (Department of Agriculture, Forestry and Fisheries, 2017, also referred to as DAFF, 2017).

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 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 is classified as low agricultural sensitivity (Figure 2). The land capability (DAFF, 2017) classifies the soils as having a low land capability (Figure 3). There are no cultivated crops on the site according to the screening tool (Figure 4).



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

FIGURE 2: RESULTS FROM THE ENVIRONMENTAL SCREENING TOOL.

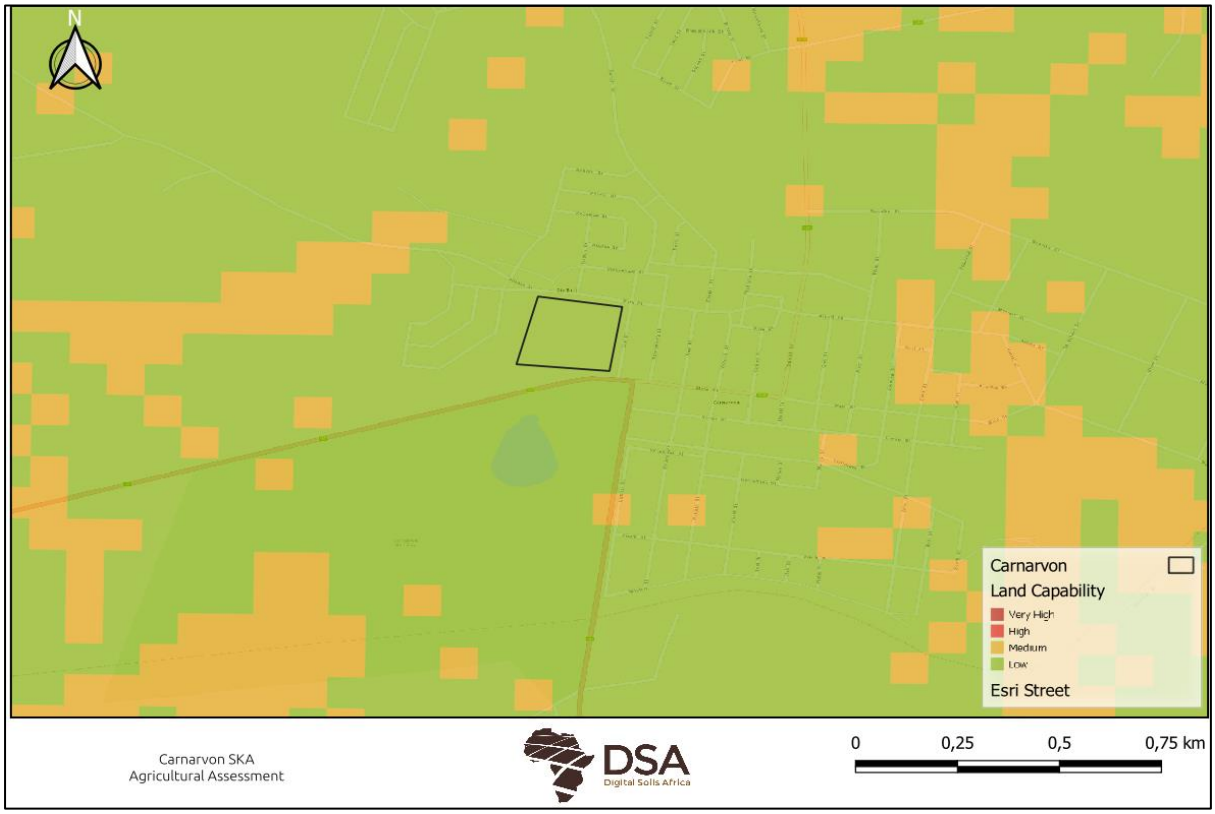


FIGURE 3: THE LAND CAPABILITY OF THE STUDY AS USED IN THE SCREENING TOOL.

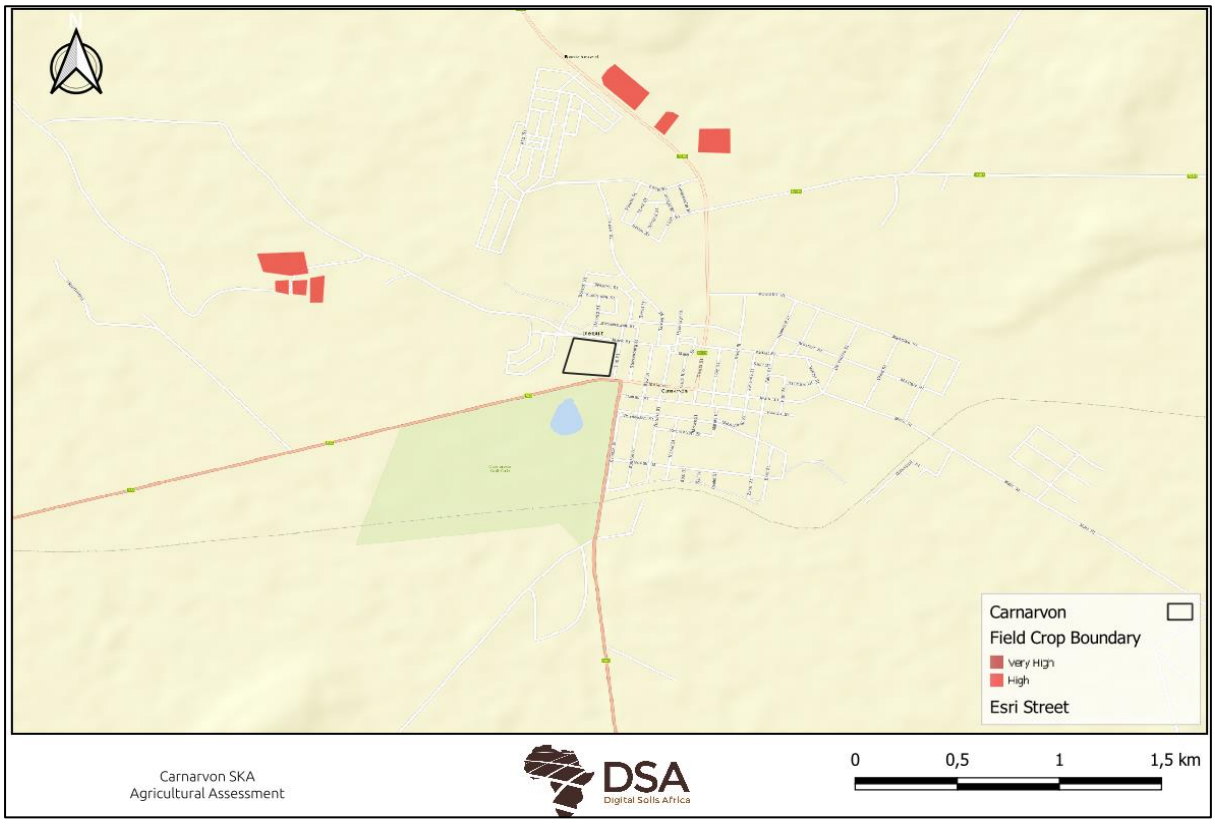


FIGURE 4: THE FIELD CROP BOUNDARIES AS USED IN THE SCREENING TOOL.

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).

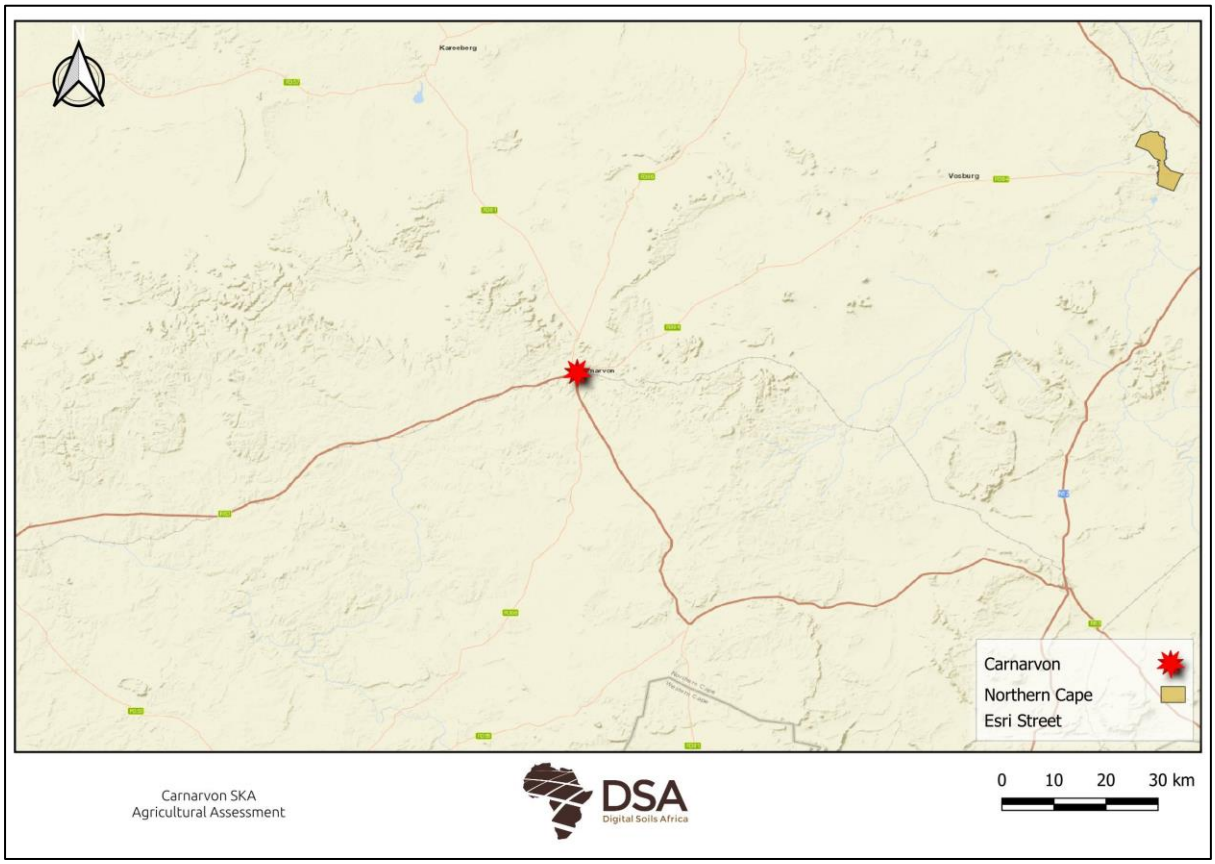


FIGURE 5: THE PROTECTED AGRICULTURAL AREAS FOR THE STUDY AREA.

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 (pg4);
- 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 (pg6);
- 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 (pg23);
- any conditions to which the statement is subjected (23);
- 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 (pg9).

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 steppe climate. There is little precipitation throughout the year. According to Köppen and Geiger, this climate is classified as BSk. The average annual temperature is 17.0°C and about 261 mm of precipitation falls annually. The site is located in an arid zone (Figure 6).

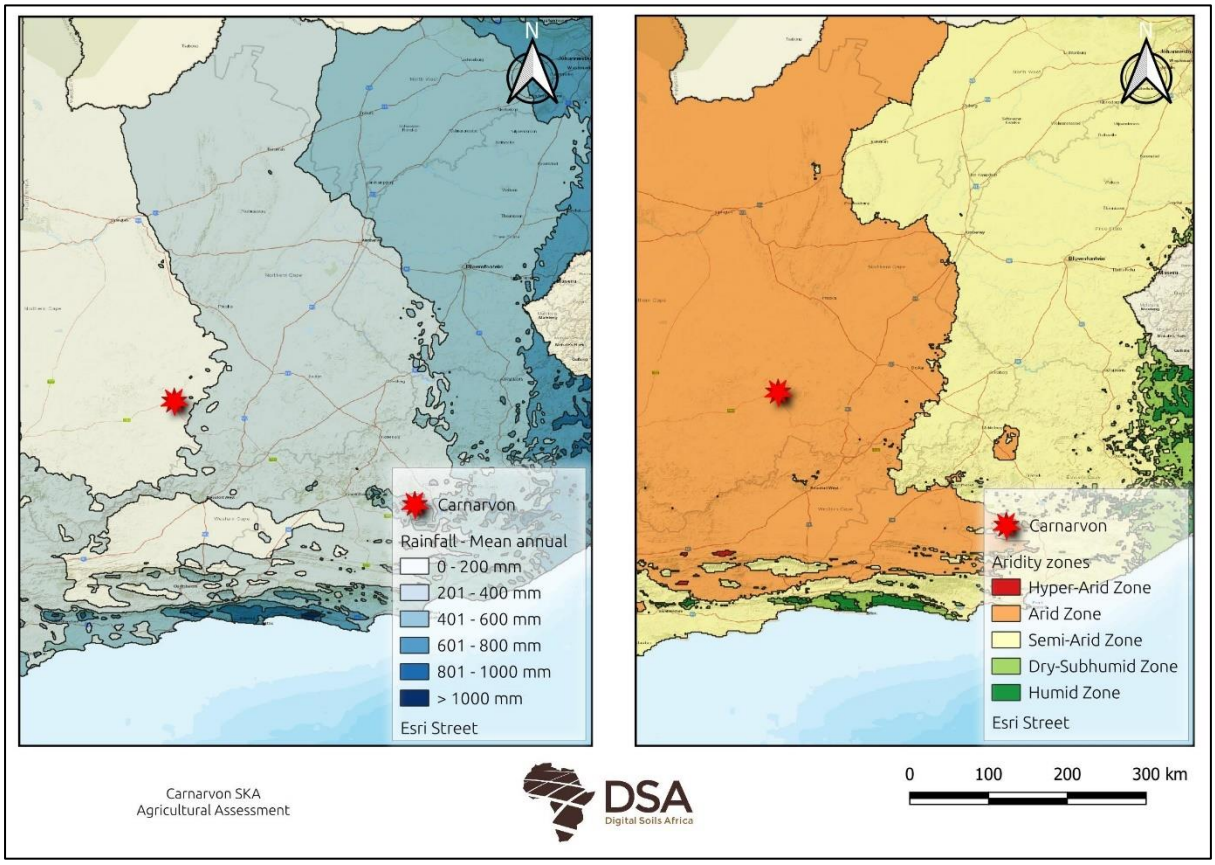


FIGURE 6: CLIMATE OF THE SITE AND THE SURROUNDING AREA (SCHULZE, 2007).

TABLE 1: CLIMATIC PROPERTIES OF CARNARVON, NOTHERN CAPE (CLIMATE-DATA.ORG).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C	24.1 °C	23.9 °C	21.4 °C	16.7 °C	12.8 °C	9 °C	8.9 °C	10.9 °C	14.5 °C	18.2 °C	20.7 °C	23.1 °C
Min. Temperature °C	16.2 °C	16.4 °C	14.5 °C	10.6 °C	7.2 °C	3.6 °C	3.1 °C	4.1 °C	6.7 °C	10 °C	12.2 °C	14.8 °C
Max. Temperature °C	31.2 °C	30.7 °C	28 °C	22.6 °C	18.6 °C	14.9 °C	15 °C	17.6 °C	21.7 °C	25.5 °C	27.9 °C	30.3 °C
Precipitation / Rainfall mm	34	35	39	29	19	12	10	9	9	17	19	29
Humidity (%)	32%	33%	38%	45%	49%	53%	47%	38%	29%	27%	27%	28%
Rainy days (d)	4	4	4	3	2	2	2	1	1	2	2	3
avg. Sun hours (hours)	12.0	11.4	10.5	9.3	8.6	8.0	8.3	9.0	10.1	11.0	11.9	12.4

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 3 (Figure 7). This is considered a low climate capability.

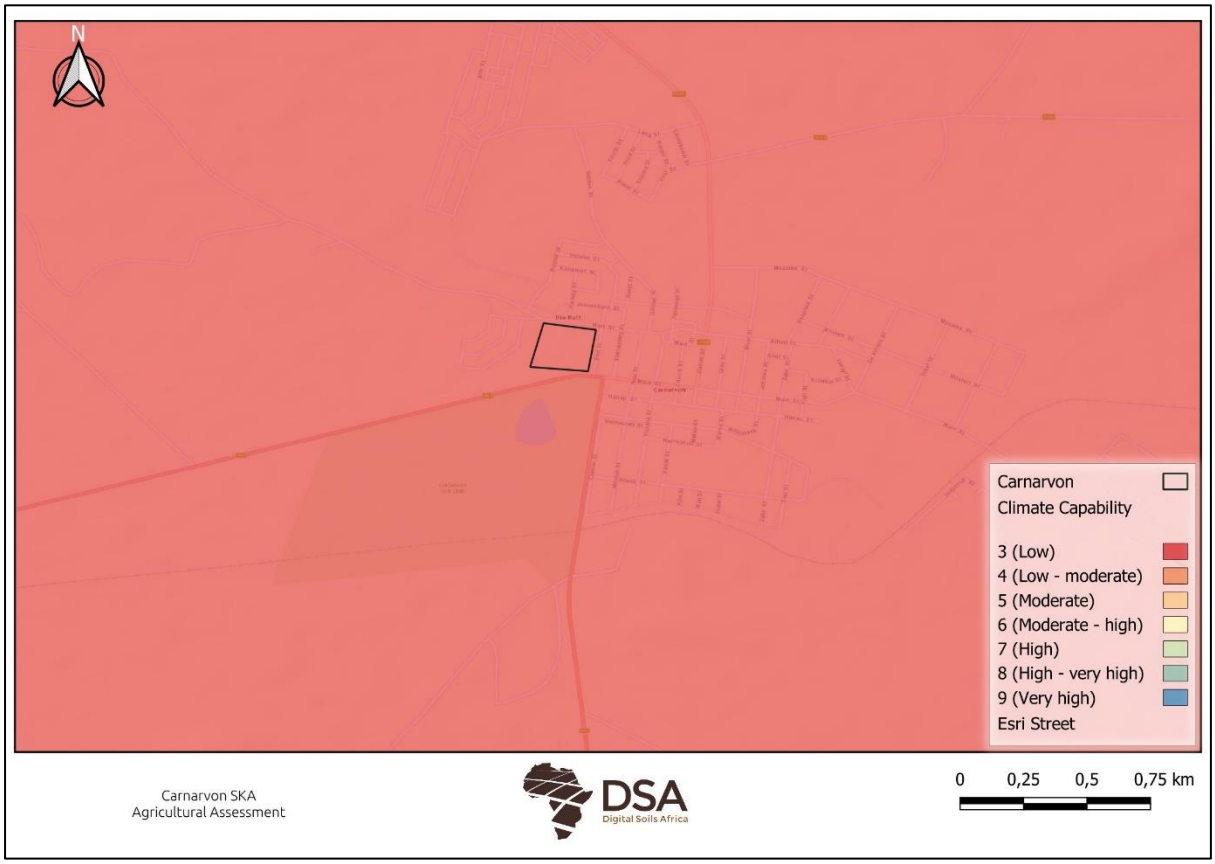


FIGURE 7: THE CLIMATE CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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 Db land type (Land Type Survey Staff, 1972 – 2002) (Figure 8). Db land types are characterised by duplex soils, described as sandier topsoil abruptly overlying more clayed subsoils. These soils comprise >50% of land type and <50% of the duplex soils have non-red B horizons.

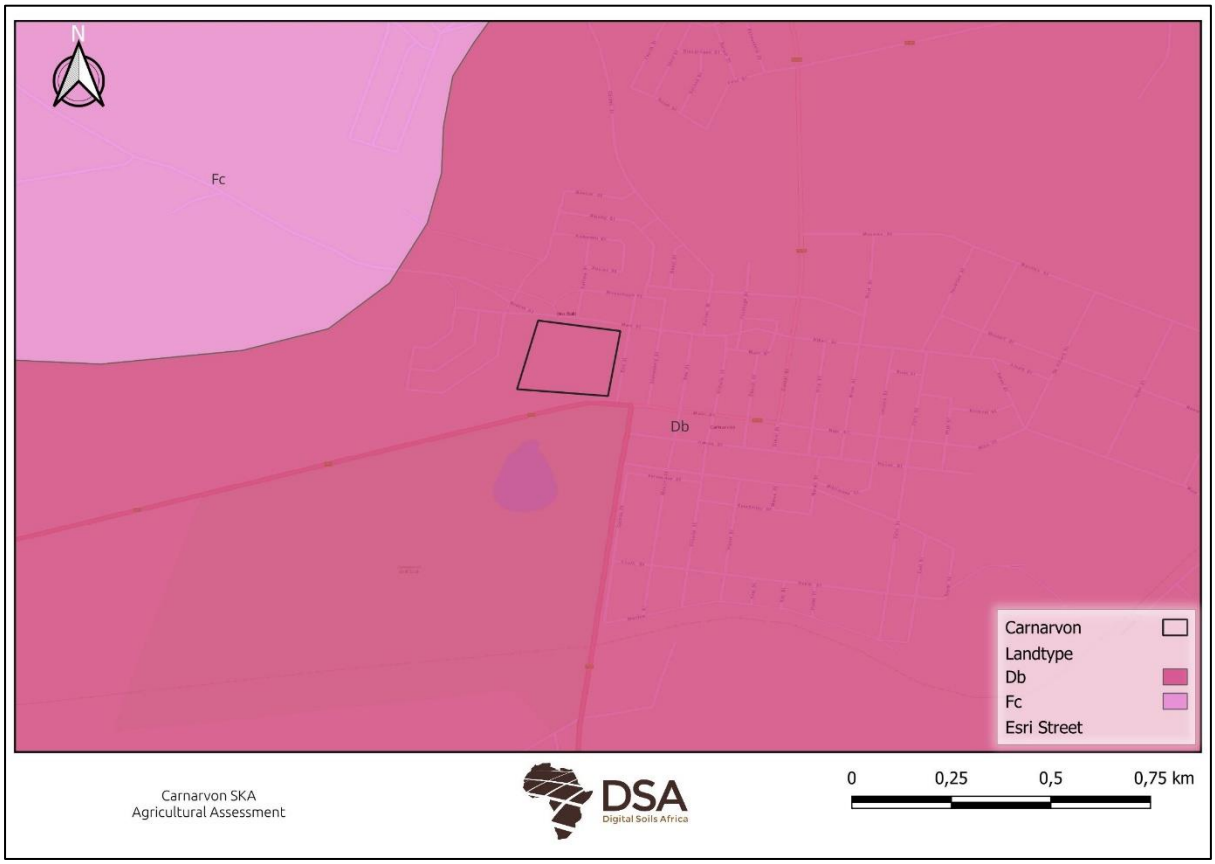


FIGURE 8: LANDTYPES FOUND IN THE STUDY AREA AND THE SURROUNDING AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

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 values of 2 (Low – vey low) and 3 (Low) (Figure 9). This is considered a very low to low soil capability.

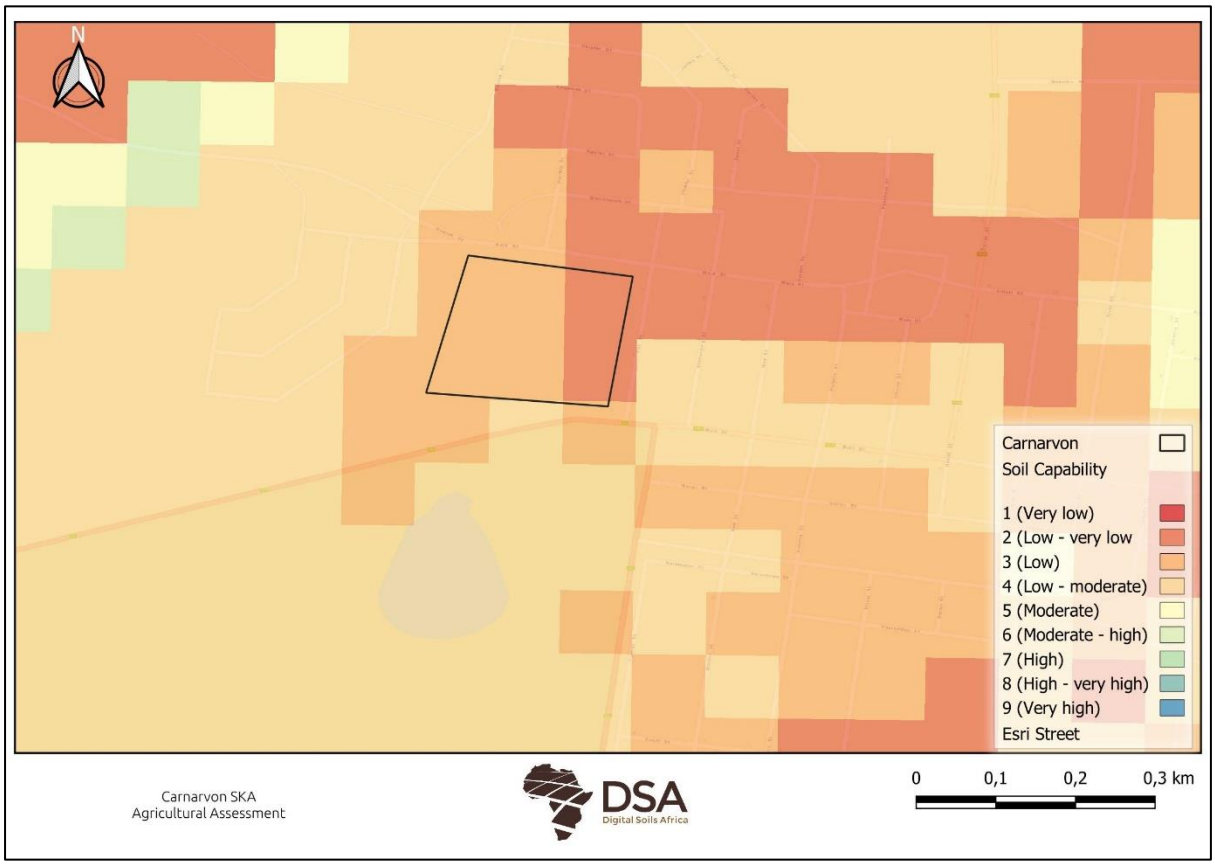


FIGURE 9: THE SOIL CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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), has values of 6 (Moderate – high) and 7 (High) (Figure 10). This is considered a moderate to high terrain capability.

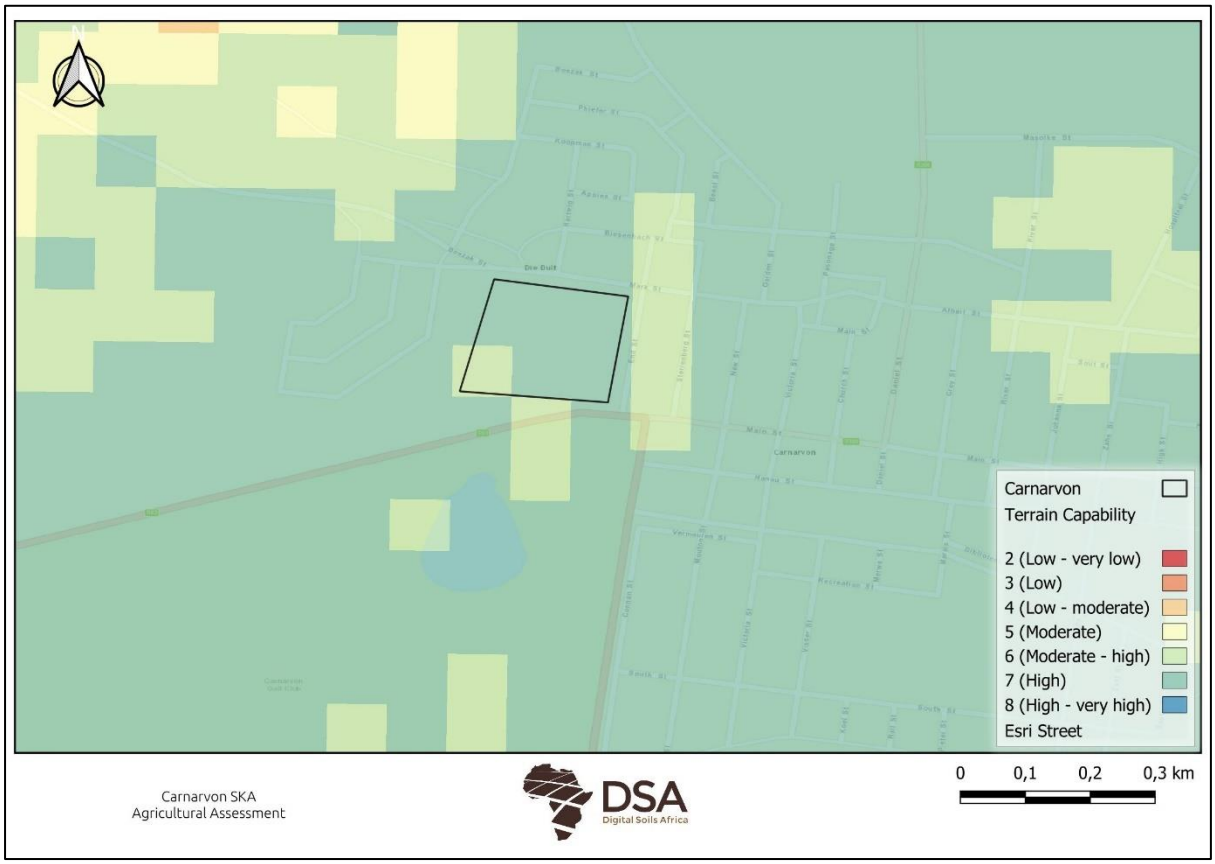


FIGURE 10: THE TERRAIN CAPABILITY OF THE SITE AND SURROUNDING AREA (DAFF, 2017).

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	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 has values of 4 (Very low – low) and 5 (Low), which is generally considered not arable (Figure 11).

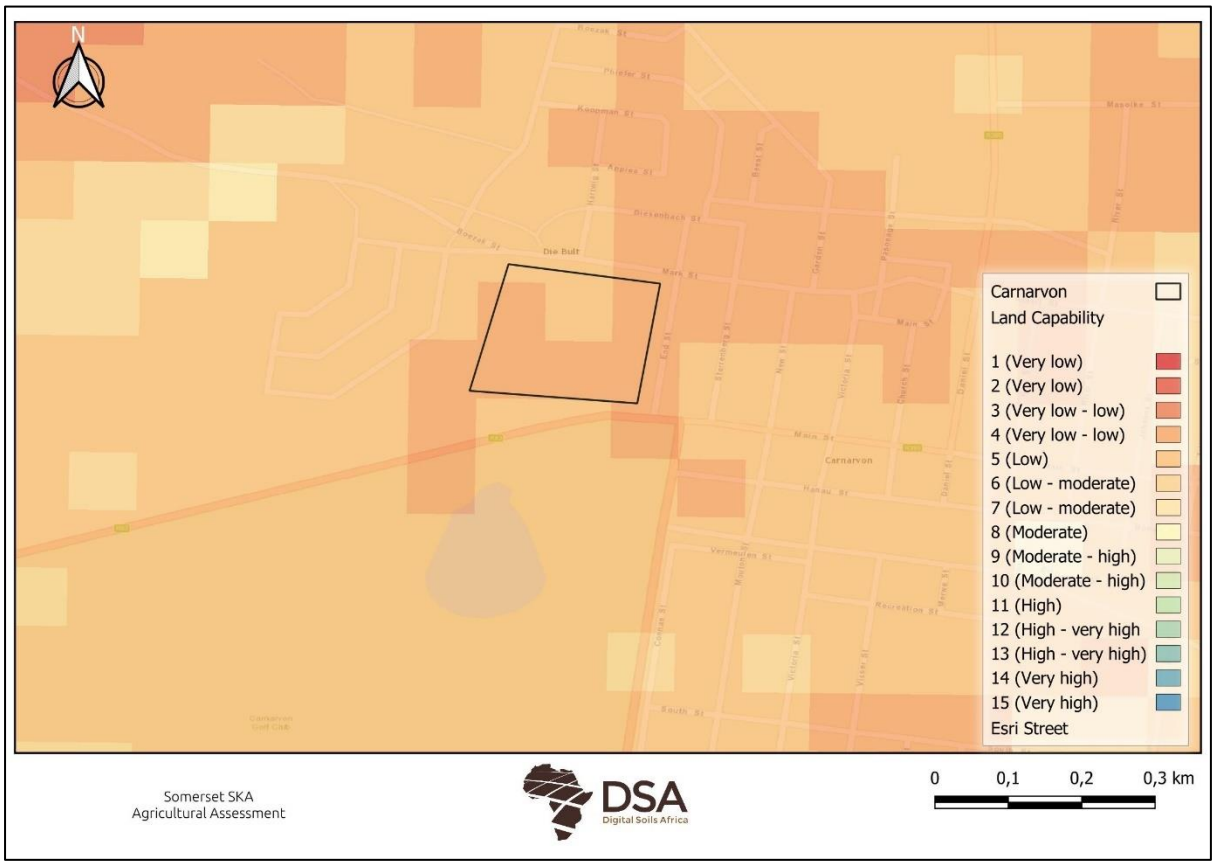


FIGURE 11: LAND CAPABILITY CLASS MAP OF THE STUDY AREA (DAFF, 2017).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU). The site has a high grazing capacity of 30 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).

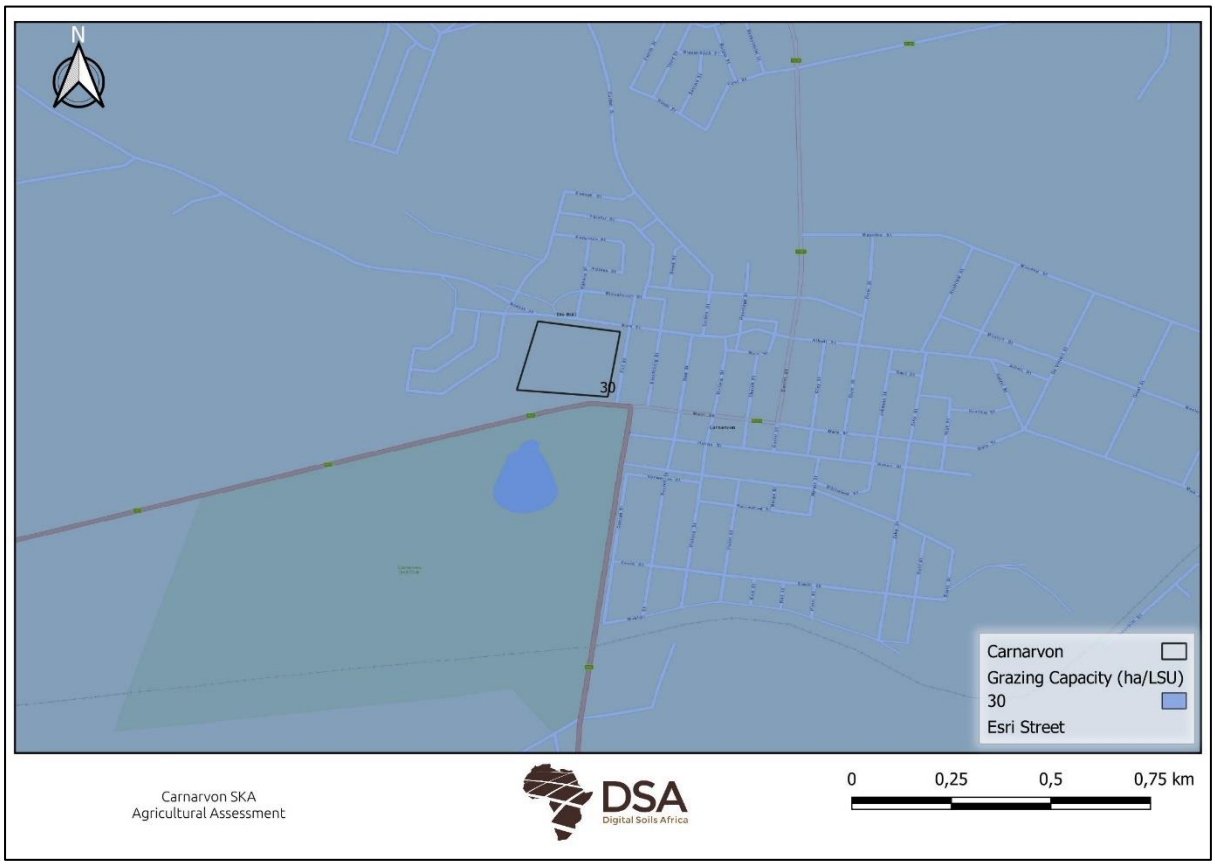


FIGURE 12: GRAZING CAPACITY FOR THE SITE AND THE SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

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. The SANLC 2020 classifies the site as 11 (Low Shrubland (Nama Karoo)), 31 (Other Bare), 50 (Residential Formal (Bare)), 55 (Village Scattered) and 65 (Commercial) (Figure 13) with the class names listed in the **Error! Reference source not found.** below.

TABLE 3: LEGEND TO Figure 13.

No.	Class Name	Class Definition
11	Low Shrubland (Nama Karoo)	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 Nama Karoo vegetation communities.
31	Other Bare	Other natural, semi-natural or man-created non-vegetated areas. Typically associated with permanent or near permanent bare ground sites that have insufficient spatial or temporal characteristics to be otherwise classified.
50	Residential Formal (Bare)	Built-up areas primarily containing formally planned and constructed residential structures and associated utilities. The surface is predominantly non-vegetated. This class therefore has the closest spatial representation to all formal residential structures and associated hard-surface footprints.
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).
65	Commercial	Built-up areas primarily containing formally planned and constructed commercial structures and associated utilities. Includes shops, offices, schools, hospitals, and administration structures.

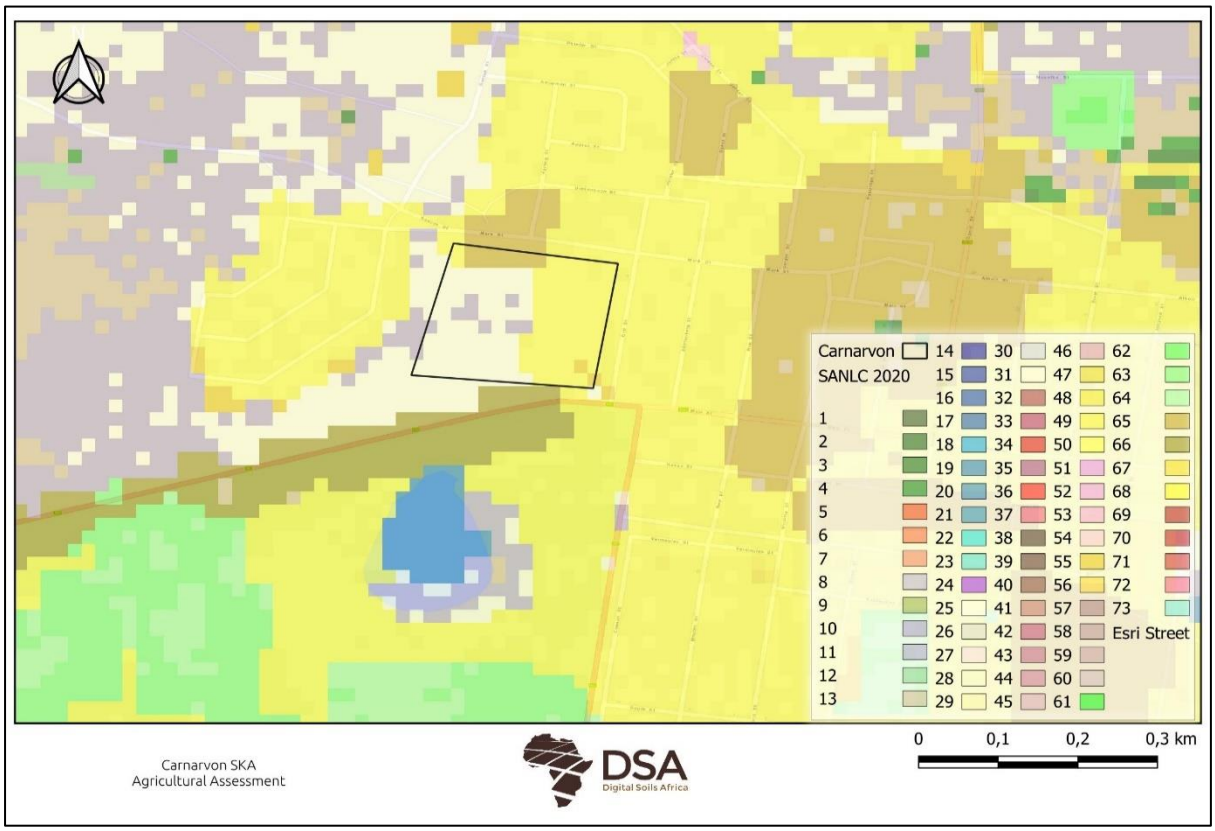


FIGURE 13: SOUTH AFRICAN NATIONAL LAND-COVER 2020 (SANLC 2020).

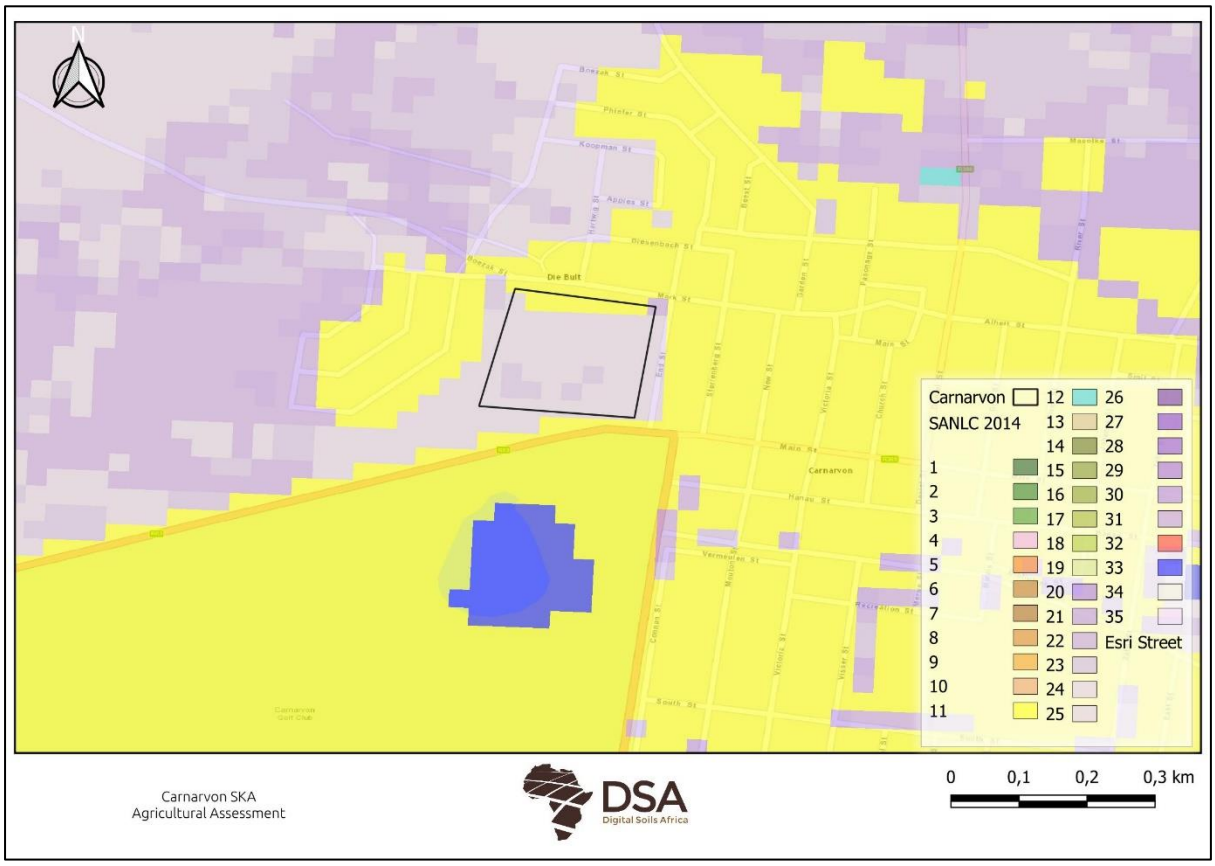


FIGURE 14: SOUTH AFRICAN NATIONAL LAND-COVER 2014 (SANLC 2014).

The Google satellite images suggest that the landuse surounding the development site has not changed in the past 9 years (2014 – 2023) (Figure 16 to Figure 18). There has been no major developments in the study site and surrounding areas.

FIGURE 15: GOOGLE SATELLITE IMAGE OF THE CARNARVON DEVELOPMENT SITE (2014).

FIGURE 16: GOOGLE SATELLITE IMAGE OF THE CARNARVON DEVELOPMENT SITE (2018).

FIGURE 17: GOOGLE SATELLITE IMAGE OF THE CARNARVON DEVELOPMENT SITE (2023).

COMPLIANCE STATEMENT

According to the screening tool, the site is classified as having a low agricultural sensitivity and a low land capability. No agricultural practices were observed from the Google satellite images.

The site has a low climate capability, very low to low soil capability and land capability. According to the land capability the site is not suitable for growing crops and has a high grazing capacity. The broad land type data indicates that the site consists duplex soils which are described as sandier topsoil overlying more clayed subsoils.

Micro siting is of a low concern as the site is covered with low shrubland (fynbos) and natural grassland forests, woodlands, smallholdings, and scattered villages, therefore, no disturbance of agricultural activities will take place during the development.

Due to the small footprint and no impact on agricultural activities, it is the specialist's opinion that the development continues. The development will not have a significant impact on agricultural activities 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