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Agricultural Assessment for the Proposed Waaihoek Grid Deviation

Submitted by TerraAfrica Consult cc

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08 July 2022

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1. Introduction

Terra-Africa Consult cc was appointed by Nala Environmental (Pty) Ltd to conduct the Agricultural Assessment for the proposed powerline deviation route from the authorised 88 kV powerline for the Waaihoek Wind Energy Facility (WEF). The authorised WEF is located south-east of Utrecht in the Emadlangeni Local Municipality, KwaZulu-Natal Province approximately 25km southwest of the town of Vryheid.

The developer bid the wind energy facility and associated infrastructure into the Renewable Energy IPP Procurement Programme (REIPPPP) Bid Window 5 for the procurement of up to 1 600MW of onshore wind energy technologies. On the 28th of October 2021, the Minister of the Department of Mineral Resources and Energy, Mr Gwede Mantashe, announced the Preferred Bidders of the Fifth Bid Submission of the Renewable Energy Independent Power Producer Procurement Programme, of which Waaihoek Wind Farm (Pty) Ltd has received Preferred Bidder Status.

The 25.5km power line infrastructure for the authorised Waaihoek Wind Energy Facility had previously been authorised (DEA Ref:. 14/12/16/3/3/2/654), however following consultation with Eskom and landowners, the powerline routing is proposed to be deviated outside of the previously assessed servitude to optimize the routing associated with the final layout of the Waaihoek Wind Energy Facility. The proponent now proposes a deviation from this authorised route along the entire length of the powerline for approximately 25,4km. The deviation of the grid connection infrastructure is proposed to meet the requirements of the Bid Window 5 and meet financial close as the project has been selected as a preferred bidder.

A Basic Assessment process will be undertaken to assess the powerline route deviation. It is noted that more than one feasible alternative may become viable following the appointment of the EAP and specialists.

The infrastructure and key components considered as part of this Basic Assessment process includes:

- Deviation of the authorized powerline, the deviation will occur along the length of the authorised route as portions of this new optimized routing falls outside of the previously authorised and assessed 50-70m servitude.
- The length of the powerline will be approximately 25,4km
- Jeep tracks of up to 4m wide and water crossings will be constructed along the powerline route to allow for construction and maintenance activities and will be assessed 400m along the length of the powerline route for approximately 25,2km
- A grid corridor of approximately 400m (200m on either side) will be assessed for the length of the powerline route.
- The Eskom portion of the 88kV switching station with a footprint of 60m x 60m within an assessed development footprint of 110m x 110m. The on-site substation has been authorised for the Waaihoek Wind Energy, however it must noted that should the Environmental Authorisation for this powerline deviation and Eskom switching be granted, it will be ceded over Eskom during the operation phase of the project.

- The following properties have been identified for the proposed route deviation of the authorised 88kV powerline for the Waaihoek Wind Energy Facility. Grid Connection infrastructure: The affected properties are listed below:

    - Portion 2 of the Farm Roodekoppe 119
    - Portion 7 of the Farm Roodekoppe 119
    - Portion 5 of the Farm Roodekoppe 119
    - Portion 4 of the Farm Roodekoppe 119
    - Portion 3 of the Farm Spartelspuit 150
    - Portion 12 of the Farm Grootvlei 66
    - Portion 13 of the Farm Grootvlei 66
    - Portion 6 of the Farm Grootvlei 66
    - Remainder of the Farm Grootvlei 66
    - Portion 5 of the Farm Vlakplaats 83
    - Portion 8 of the Farm Vlakplaats 83
    - Portion 9 of the Farm Vlakplaats 83
    - Portion 10 of the Farm Vlakplaats 83
    - Portion 3 of the Farm Vlakplaats 83
    - Portion 9 of the Farm Groothoek 152
    - Portion 4 of the Farm Waaihoek 173
    - Portion 9 of the Farm Waaihoek 173
    - Portion 11 of the Farm Waaihoek 173
    - Portion 6 of the Farm Waaihoek 173
    - Portion 1 of the Farm Groothoek 152
    - Portion 5 of the Farm Wijdgelegen 17068

2. Details of the specialist

Mariné is a scientist registered with the South African Council for Natural Scientific Professions (SACNASP) and is specialised in the fields of Agricultural Science and Soil Science. Her SACNASP Registration Number is 400274/10. Mariné holds a BSc. degree in Agricultural Science (with specialisation in Plant Production) from the University of Pretoria and a MSc. Degree in Environmental Science from the University of the Witwatersrand. She has consulted in the subject fields of soil, agriculture, pollution assessment and land use planning for the environmental sector of several African countries including Botswana, Mozambique, Democratic Republic of Congo, Liberia, Ghana and Angola. Mariné's project experience conducting assessments for renewable energy projects include solar and wind energy facilities in the Western, Northern and Eastern Cape as well as the North West, Free State and KwaZulu Natal Provinces. Her contact details are provided in Appendices 1 and 2 attached.

Jan-Dirk is a candidate scientist registered with the South African Council for Natural Scientific Professions (SACNASP) and is specialized in the fields of Agricultural Science and Soil Science. His SACNASP registration number is 400274/13. Jan-Dirk holds a BSc. Degree in Agricultural Science (with specialization in Soil Science) from the University of the Free State and a MSc. Degree in Soil Science from the University of the Free State.

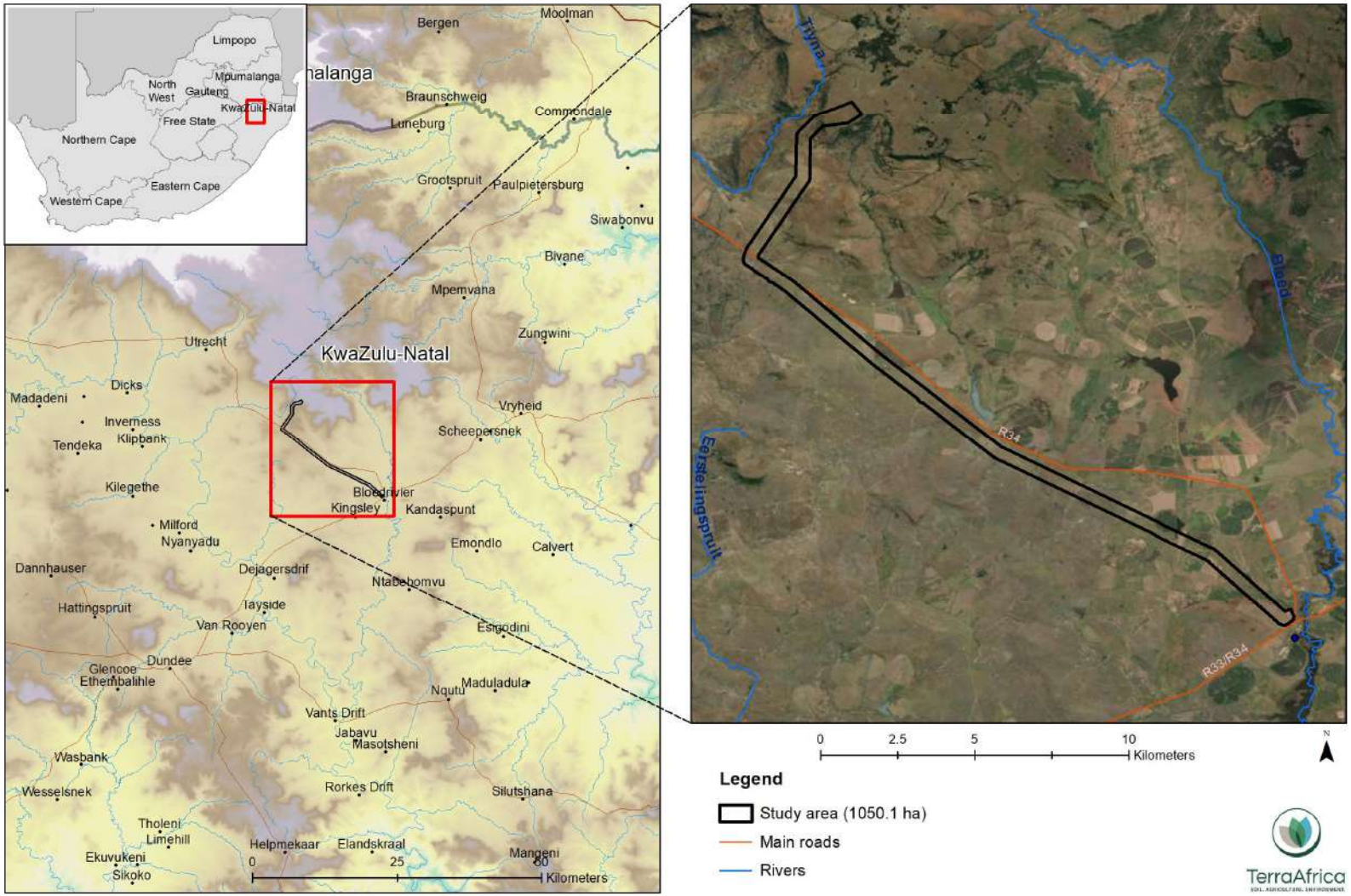


Figure 1: Locality of the proposed Waaihoek Grid Deviation

3. Purpose and objectives of the compliance statement

The overarching purpose of the Agricultural Agro-Ecosystem Specialist Assessment (from here onwards also referred to as the Agricultural Assessment) that will be included in the final Basic Assessment Report, is to ensure that the sensitivity of the site to the proposed land use change (from agriculture to renewable energy generation) is sufficiently considered. Also, that the information provided in this report, enables the Competent Authority to come to a sound conclusion on the impact of the proposed project on the food production potential of the site.

To meet this objective, site sensitivity verification must be conducted of which the results must meet the following objectives:

- It must confirm or dispute the current land use and the environmental sensitivity as was indicated by the National Environmental Screening Tool.
- It must contain proof of the current land use and environmental sensitivity pertaining to the study field.
- All data and conclusions are submitted together with the Basic Assessment report for the proposed Waaihoek Grid Deviation.

According to GN320, the Agricultural Agro-Ecosystem Assessment that is submitted must meet the following requirements:

- It must identify the extent of the impact of the proposed development on the agricultural resources.
- It must indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site, and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources.

The following checklist is supplied as per the requirements of GNR 320, detailing where in the report the various requirements have been addressed:

GNR 320 requirements of an Agricultural Agro-Ecosystem Statement (High to Very High Sensitivity)	Reference in this report
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;	Appendices 1 and 3
A signed statement of independence by the specialist;	Appendix 1
The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 7.2
A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant;	Section 7.2
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;	Section 6, Figures 2 and 3

An indication of the potential losses in production and employment from the change of the agricultural use of the land because of the proposed development;	Section 10.2
An indication of possible long term benefits that will be generated by the project in relation to the benefits of the agricultural activities on the affected land;	Section 10.2
Additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc.;	Section 10.3
Information on the current agricultural activities being undertaken on adjacent land parcels;	Section 9.5
A motivation must be provided if there were development footprints that were identified as having a “medium” or “low” agriculture sensitivity and that were not considered appropriate;	Section 9.7
Confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities;	Section 9.7
A substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development;	Section 12
Any conditions to which this statement is subjected;	Sections 11 and 12
Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr);	Section 12
A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 8
Calculations of the physical development footprint area for each land parcel as well as the total physical development footprint area of the proposed development (including supporting infrastructure);	Section 10.1
Confirmation whether the development footprint is in line with the allowable development limits set in Table 1 above, including where applicable any deviation from the set development limits and motivation to support the deviation, including: a) Where relevant, reasons why the proposed development footprint is required to exceed the limit; b) Where relevant, reasons why this exceedance will be in the national interest; and c) Where relevant, reasons why there are no alternative options available including evidence of alternatives considered; and	N/A
A map showing the renewable energy facilities within a 50km radius of the proposed development.	Figure 21

4. Terms of Reference

In addition to the requirements stipulated in GNR 320, the following Terms of Reference, as stipulated by Nala Environmental, apply to the Agricultural Assessment:

- to ensure a thorough assessment, that includes both the desktop assessment of databases and aerial photography; a description of the on-site verification of the agricultural potential of the area; and the soil forms present in the development area;
- identify and assess potential impacts on both agricultural potential and soil resulting from the proposed project;
- identify and describe potential cumulative soil and agricultural potential impacts resulting from the proposed project in relation to proposed and existing developments in the surrounding area; and
- recommend mitigation, management and monitoring measures, to minimise impacts and/or optimise benefits associated with the proposed project.

5. Legislative framework of the assessment

The report follows the protocols as stipulated for agricultural assessment in Government Notice 320 of 2020 (GNR 320). This Notice provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA). It replaces the previous requirements of Appendix 6 of the Environmental Impact Assessment Regulations of NEMA.
In addition to the specific requirements of GN320 for this study, the following South African legislation is also considered applicable to the interpretation of the data and conclusions made with regards to environmental sensitivity and the conservation of soil resources of the project area:

- the Conservation of Agricultural Resources Act (No 43 of 1983) (CARA) states that the degradation of the agricultural potential of soil is illegal. CARA requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed; and
- the National Water Act (No 36 of 1998) (NWA) deals with the protection of water resources (i.e. wetlands and rivers). Hydric soils with wetland land capability are not part of the proposed development area and the NWA is therefore not applicable.

6. Agricultural Sensitivity

The combined Agricultural Sensitivity of the proposed project area was determined by using the National Environmental Screening Tool (www.screening.environment.gov.za). The screening reports were generated by Nala Environmental (Pty) Ltd. The map depicted in Figure **2** shows the agricultural sensitivity of the 88kV powerline while Figure **3 Error! Reference source not found.** shows the agricultural sensitivity of the 88kV Eskom on-site switching station.

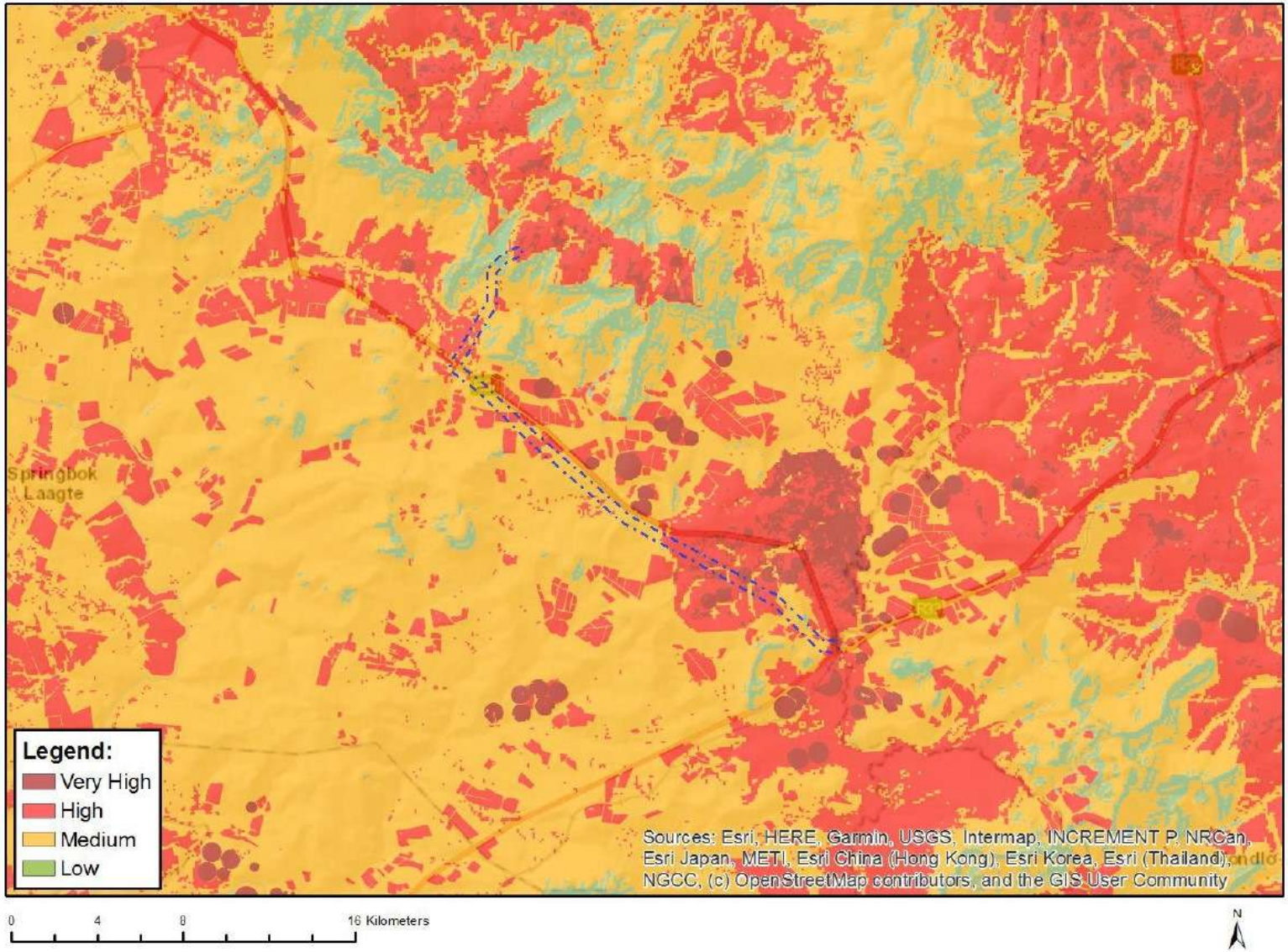


Figure 2: Agricultural Combined Sensitivity of the Waaihoek 88kV powerline (generated by Savannah Environmental, 2022)

Figure 3: Agricultural Combined Sensitivity of the Waaihoek 88kV Eskom on-site switching station (generated by Nala Environmental, 2022)

The results provided by the screening tool indicate that approximately 35 to 40% of the 88kV powerline corridor falls in areas with high agricultural sensitivity (see Figure **2**) while the 88kV Eskom on-site switching station is entirely located in an area of high agricultural sensitivity (Figure **3**). The largest part of the powerline corridor has Medium sensitivity and only a small area has Low sensitivity the far north western side. The area adjacent to the grid corridor, consists mostly of land with High and Medium agricultural sensitivity while the area of the on-site switching station is surrounded by land with High sensitivity.

In alignment with the CARA, the Department of Agriculture, Land Reform and Rural Development (DALRRD) developed spatial data that depict High Potential Agricultural Areas (HPAAs) of the different provinces of South Africa (DALRRD, 2019). According to the DALRRD, these areas can be defined as: *"large, relative homogeneous portions of high value agricultural land that has the potential to sustainably, in the long-term, contribute significantly to the production of food.*"

The data layer of the HPAA's of Kwazulu-Natal Province shows that the proposed grid deviation falls mostly inside the HPAA. The western parts fall outside the HPAA, while the eastern parts fall inside (refer to Figure **4**). According to the data (DALRRD, 2019), this corner is part of a delineated Category C irrigated HPAA (IR).

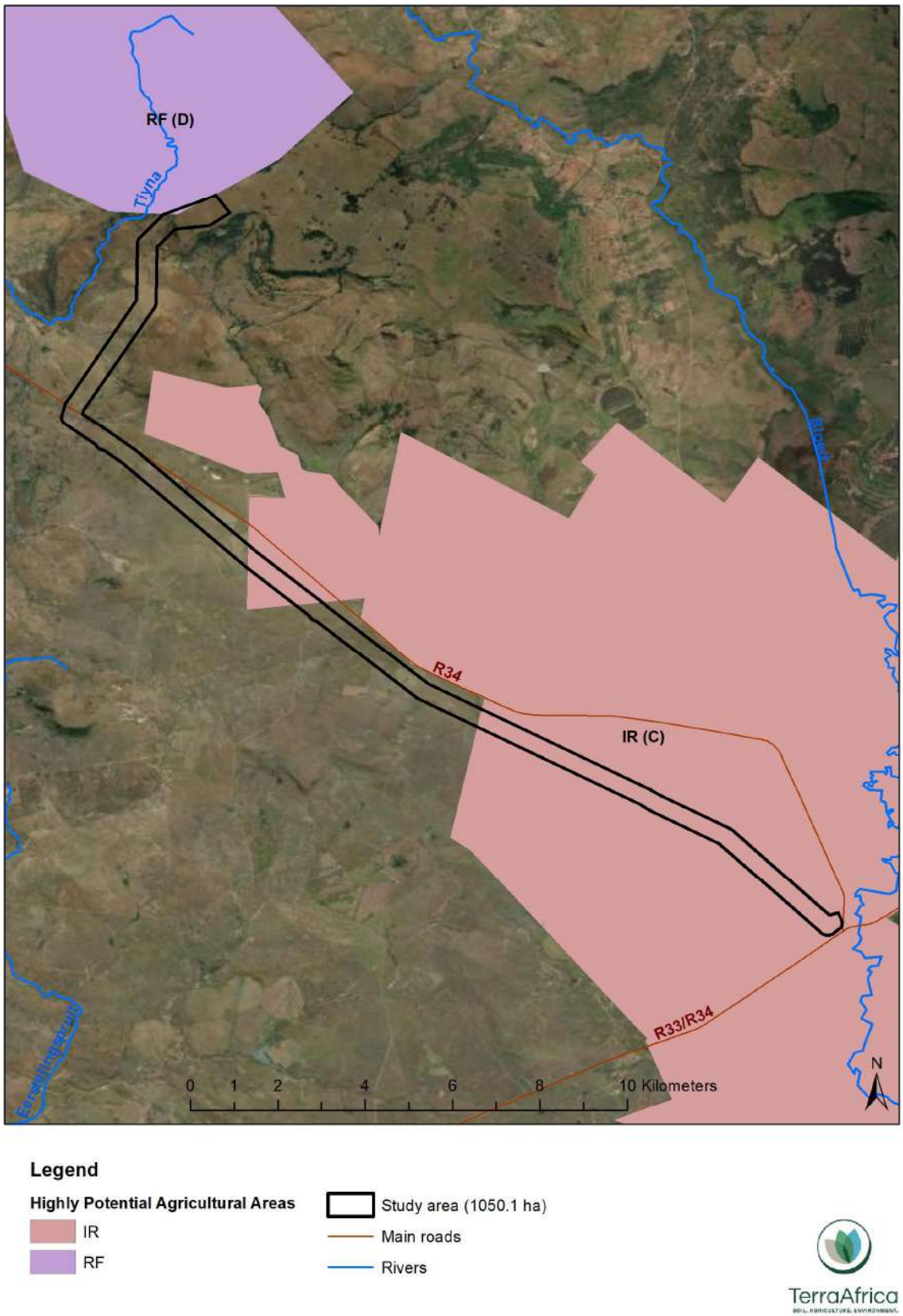


Figure 4: Presence of High Potential Agricultural Areas around the Waaihoek Grid Deviation (DALRRD, 2019)

7. Methodology

The different steps that were followed to gather the information used for the compilation of this report is outlined below. The methodology is in alignment with the requirements of GNR 320.

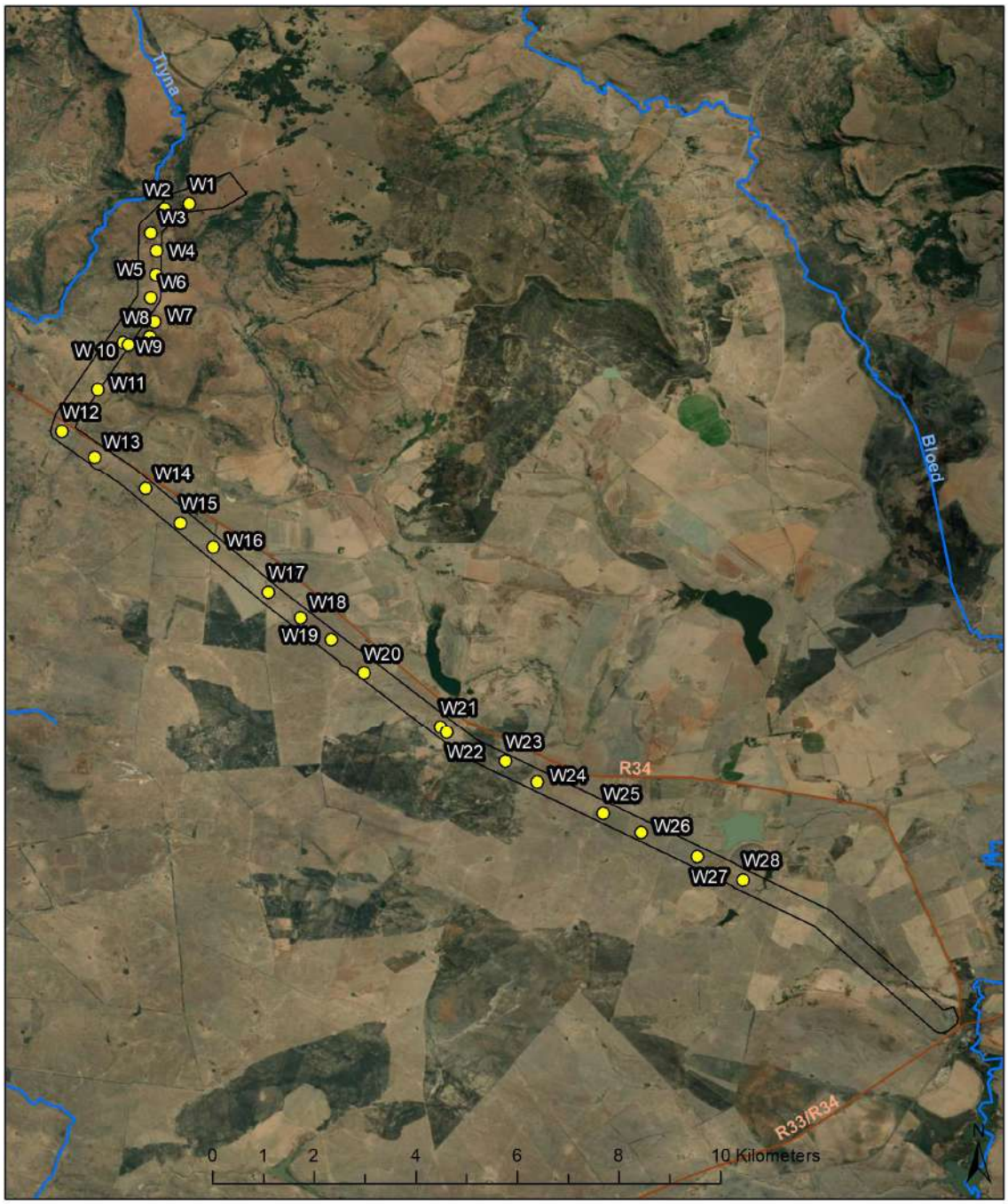
7.1 Assessment of available data

The most recent aerial photography of the area available from Google Earth was obtained. The satellite imagery was used to analyse the terrain of the proposed grid deviation and the surrounding area. The analysis considered the slope, typical terrain units and landscape features, such as existing roads, farm infrastructure and areas where land degradation may be present. The proposed development area was also superimposed on five different raster data sets obtained from the National Department of Agriculture, Land Reform and Rural Development (DALRRD). The data sets are:

- Land type data for the project assessment zone was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 – 2006). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units.
- The Refined Land Capability Evaluation Raster Data for South Africa that was developed using a spatial evaluation modelling approach (DALRRD, 2016).
- The long-term grazing capacity for South Africa 2018 that present the long term grazing capacity of an area with the understanding that the veld is in a relatively good condition (South Africa, 2018).
- The Kwazulu-Natal Field Crop Boundaries show crop production areas may be present within the development area. The field crop boundaries include rainfed annual crops, non-pivot and pivot irrigated annual crops, horticulture, viticulture, old fields, small holdings and subsistence farming (DALRRD, 2019).
- The High Potential Agricultural Areas for Cultivation: Kwazulu-Natal Province, 2019 are large, relatively homogeneous areas of land within the province regarded as having high potential and capability to contribute towards food production in both the province and the country (DALRRD, 2019).

7.2 Site assessment

The site visit was conducted to ensure that all the properties within the grid deviation, could be accessed for soil classification. The site visit was done on the 26th and 27th of April 2022 (autumn). The season during which the assessment was done, has no influence on the results. The soil profiles were examined to a maximum depth of 1.2 m using a hand-held auger. Observations on site were made regarding soil texture, structure, colour and soil depth at each survey point. The locality of each survey point is shown in Figure 5. A cold 10% hydrochloric acid solution was used on site to test for the presence of carbonates in the soil. Qfield software were used to log the coordinates of each of the survey points. The position of the survey points is shown in **Figure 5**. The soils are described using Soil Classification: A Natural and Anthropogenic System for South Africa (Soil Classification Working Group, 2018).



Legend

- Survey points
- Study area (1050.1 ha)
- Main roads
- Rivers

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Figure 5: Locality of on-site soil classification and observation points within the Waaihoek Grid Deviation

Other observations made during the site visit include recording the presence of any farm or other buildings, cattle handling facilities and water troughs. The larger area around the study area was also assessed by driving through the area to gain an understanding of the agro-ecosystem within which the study area functions. Photographic evidence of soil properties, current land uses and farm infrastructure were taken with a digital camera and presented in Section 9 of the report.

7.3 Analysis of samples

Eight soil samples were collected during the soil survey. The soil was stored and sealed in a clean sampling bag and submitted to Van's Lab in Bloemfontein for analysis. Samples were analysed for the following parameters:

- pH (using potassium chloride);
- Major cationic plant nutrients (calcium, magnesium, potassium, sodium) using ammonium acetate;
- Plant-available phosphorus (using Bray 1 extract); and
- Texture (using the three-sieve technique to determine the particle size distribution).

7.4 Impact assessment methodology

Following the methodology prescribed by Savannah, the direct, indirect and cumulative impacts associated with the project have been assessed in terms of the following criteria:

- the **nature**, including a description of what causes the effect, what will be affected and how it will be affected;
- the **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional; and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high);
- the **duration**, wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5;
- the **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment; 2 is minor and will not result in an impact on processes; 4 is low and will cause a slight impact on processes; 6 is moderate and will result in processes continuing but in a modified way; 8 is high (processes are altered to the extent that they temporarily cease); and 10 is very high and results in complete destruction of patterns and permanent cessation of processes;
- the **probability** *of occurrence*, describing the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable

(distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures);

- the **significance**, determined through a synthesis of the characteristics described above and can be assessed as low, medium or high;
- the **status**, described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the *degree* to which the impact can be *mitigated.*

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

where:

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated); and
- 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

8. Study gaps, limitations and assumptions

All assumptions made with the interpretation of the baseline results and anticipated impacts, are listed below:

- It is assumed that the only area to be fenced off will be the Eskom on-site switching station and that grazing between the pylons of the powerline, will still be possible. The assumption is therefore made that farming will not be excluded from the grid assessment corridor;
- It is further assumed that the activities for the construction and operation of the infrastructure are limited to that typical for the construction and operation of a 88kV power line and an on-site switching station; and
- The assumption is made that the construction team that will install the power line and on-site switching station, are trained and knowledgeable in following best practice environmental management measures to minimise or avoid environmental degradation.

The following limitations is part of the assessment:

- Portion 7 and Portion 2 of the Farm Roodekoppe 119 had limited access during the time of the site visit. To ensure that sufficient soil information is considered for the report, the soil classification data presented in the Agricultural and Soil Assessment by EOH Coastal and Environmental Services (11 June 2014) for the Proposed Waaihoek Wind Energy Facility, were also reviewed.
- The anticipation and rating of impacts are based on the report author's knowledge and experience on the nature of construction and operation of grid infrastructure. Therefore, it is done as accurately as possible but must not be considered as absolute measures.

No other information gaps, limitations and assumptions have been identified.

9. Baseline description

9.1 Soil properties

The soil profiles classified within the Waaihoek grid deviation study area consists of natural soil profiles (undisturbed by human activities) and no anthropogenic soil materials are present within this area. The positions of the different soil forms are depicted in **Figure 7**.

a) Mispah

The Mispah soils have shallow soil depths (100-300 mm) The effective soil depth of the Mispah soils is restricted by solid and fractured rock. In some areas, the solid rock is visible on the surface as rock outcrops (as shown in Figure **6**). The Mispah soil form was found in the far northwestern side and only occurred once in the study area at the top of the hill.

Figure 6: Photographic example of solid rock on the surface of Mispah soils

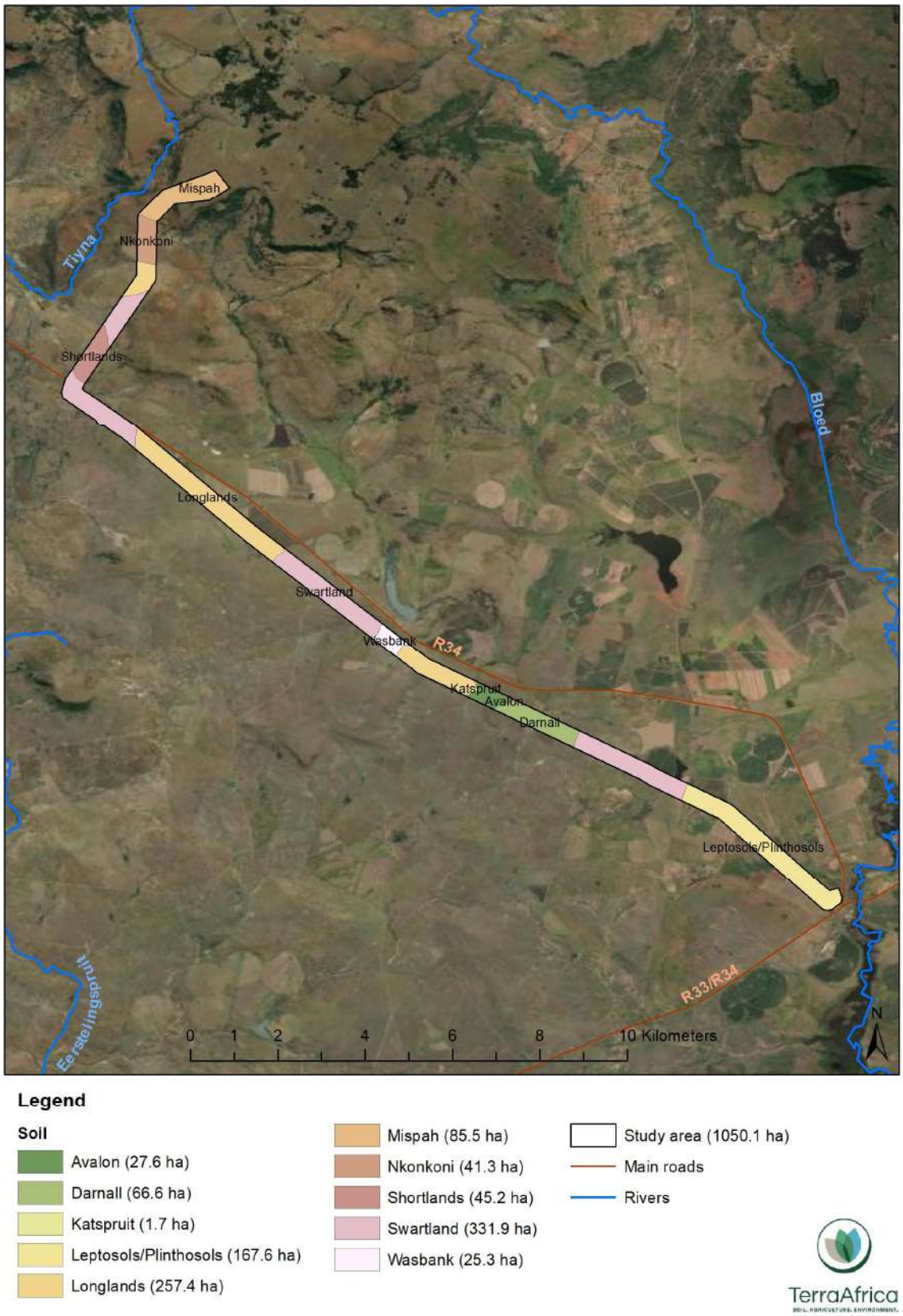

Figure 7: Soil classification map of Waaihoek Grid Deviation

b) Nkonkoni soils

The Nkonkoni is found just beneath the Mispah soil form in the northwestern area, and only occurs once. Both soil depths exceed 1000 mm, indicating that the soil is of high agricultural potential. The Nkonkoni soils consist of chromic (red) topsoil with sandy-loam texture that overlies a red apedal horizon (see **Figure 8**). The red apedal horizon is limited in soil depth by the presence of lithic material (1000 mm). The lithic horizon is of saprolithic characteristics. The soil form occupies 41.3 ha of the total study area.

Figure 8: Nkonkoni soil within the Waaihoek grid deviation

c) Swartland soils

The Swartland soil covered most of the study area with 331.9 ha. The Swartland soil form has the following horizons, orthic on pedocutanic on lithic. The pedocutanic had depths of between 600 and 900 mm, whereafter the lithic horizon was restrictive. The lithic horizon had saprolithic characteristics. The pedocutanic had moderate to strong structure and had clear cutans (see **Figure 9**). The pedocutanic was defined as brown without vertic properties. Lime was also not present. The Swartland is of moderate agricultural potential due to high clay content. It was also observed that areas where the Swartland soil form was found that livestock was the primary land use.

Figure 9: Pedocutanic horizon with strong structure of the Swartland soils within the grid corridor

d) Avalon soils

The Avalon consists of an orthic horizon overlying a yellow/brown apedal on soft plinthic. The soil form was only found in a very small part of the area, covering only 27.6 ha. The yellow/brown was shallow only reaching 500 mm in depth. The restricting layer was the soft plinthic in which clear mottling of iron and manganese was found, together with grey colors as defined for the soft plinthic horizon (see **Figure 10**).

Figure 10: Avalon soils within the grid deviation study area

e) <u>Longlands soils</u>

The Longlands soil was the second most found soil form of the study area. It covered approximately 257.4 ha of the total area. The Longlands soil form consist of an orthic horizon overlying an albic horizon, with a soft plinthic horizon underneath. The albic horizon had clear grey colors as defined for the albic horizon (see **Figure 11**). The albic reached depths of 700 mm whereafter the soft plinthic was found. Its worthy to note that the water table was found where the soft plinthic started (700 mm)

Figure 11: Longlands soil form, left hand picture shows the albic horizon, while the right-hand picture shows the soft plinthic.

f) <u>Darnall soils</u>

The Darnall soil forms is a melanic horizon overlying a pedocutanic horizon with a lithic horizon underlying the pedocutanic. The Darnall covered 66.6 ha and had depths of 800 mm whereafter the lithic horizon restricted the hand auger. The pedocutanic had clear cutans and has sub-angular structure (see Figure 12).

Figure 12: Pedocutanic with cutans in the centre of the Darnall soils

g) Shortlands soils

Shortland soil form consists of an orthic A, overlying a red structured horizon. The soil form was found only on a small part of the study area (42.2 ha). The red structured horizon had a moderate to strong structure and peds were clearly visible, indicating that the clay was a 1:1 clay mineral. Shortland soil are of high agricultural potential and due to the strong structure erosion is of low risk.

Figure 13: Shortland soil form within the Waaihoek grid deviation

h) Katspruit soils

The Katspruit soil was found near a dam and only covered 1.7ha which is accociated with the boundary of the dam, the Katspuit consisted of an orthic horizon overlying a gley horizon. The Katspruit soil form was found in the center of the grid deviation. The Katspruit reached depths of 1000 mm.

Figure 14: Katspruit soil form

i) Leptosols

The area where Leptosols were delineated, was derived from the soil map of EOH Coastal and Environmental Services (June 2014) that was included in the Soil and Agricultural Assessment of the Proposed Waaihoek Wind Energy Facility. Leptsols are soils with a very shallow profile depth (indicating little influence of soil-forming processes), and they often contain large amounts of gravel. Leptosols were found in the far southeastern end of the Waaihoek grid deviation and covered approximately 167.6 ha. They typically remain under natural vegetation, being especially susceptible to erosion, desiccation, or waterlogging, depending on climate and topography.

j) Wasbank soils

The Wasbank soil form was found on only a very small area of the study area (25.3 ha). The Wasbank soil form had a restrictive layer which was defined as hard plinthic. The soil form consists of an orthic horizon overlying an albic horizon on top of hard plinthic. The albic only

reached depths of 600 mm and was found just west of the Longlands soil form. The Wasbank soil was found at the bottom part of the hill and the Longlands at the top of the hill.

Figure 15: Wasbank soil form, showing the albic horizon

9.2 Soil texture

The soil texture of the soil forms present within the proposed development area, was calculated by using the results of the particle size analysis for the soil texture triangle formulas as provided on the website of the United States Department of Agriculture's under Natural Resource Conservation Services (Soil) (www.nrcs.usda.gov). The results of the particle size analysis of the soil samples as well as the soil texture class into which results translate, are presented in Table 1 below. Following the results, the soils within the project site, has Sandy Clay Loam, Clay Loam and Clay texture.

Table 1: Summary of particle size distribution and soil texture classes of the soil samples analysed

Sample no:	Particle size distribution (%)			Texture class
	Sand	Silt	Clay	
W3 B	21,6	32,3	46,6	Clay
W4 B	23,5	33,0	43,9	Clay
W11A	59,6	15,2	25,5	Sandy Clay Loam
W14 A	60,0	15,5	25,4	Sandy Clay Loam
W14 B	56,2	18,7	25,4	Sandy Clay Loam
W16 A	27,2	31,7	41,7	Clay
W18 A	57,1	20,2	23,2	Sandy Clay Loam
W22 B	44,0	20,9	35,7	Clay Loam

9.3. Soil fertility parameters

The results of the soil fertility parameters that were determined for the soil samples, are presented in Table 2.

Table 2: Soil analysis results

Sample no:	pH(KCl)	P (Bray 1) (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	K (mg/kg)	Na (mg/kg)
W3 B	5,34	2,32	2079,03	981,00	72,63	52,25
W4 B	4,84	3,08	1845,06	667,77	63,75	47,51
W11A	5,04	4,90	396,60	336,74	78,37	520,55
W14 A	4,39	3,90	816,35	506,76	129,85	8,80
W14 B	4,47	4,16	764,59	564,20	77,10	23,88
W16 A	4,61	4,24	3004,44	1252,32	204,17	75,17
W18 A	4,25	12,66	566,92	138,63	149,44	8,34
W22 B	5,13	4,92	747,56	423,02	75,96	0,50

The pH values of the samples analysed range between extremely acidic (lowest pH of 4.25) and strongly acidic (highest pH of 5.34). From the perspective of the soil fertility parameters analysed, the cation exchange complex is dominated by calcium, followed by magnesium and then sodium in all the samples analysed except W11A. At W11A, the sodium concentration dominates the cation exchange complex and soils may be at risk of soil sodicity. The plant-available phosphorus levels are low in all samples analysed and range between 2.32 and 12.66 mg/kg. Low soil phosphorus concentrations are also typical of undisturbed soils under natural vegetation in South Africa.

9.4 Land capability

The position of the different land capability classes within the Waaihoek powerline deviation, are depicted in . The dominant land capability class within the grid deviation, is Low-Moderate (Class 07). The highest land capability class within this area is High (Class 11) which is located in the south eastern side of the study area. A small part is also found in the northern part of

the study area. The higher land capability largely agrees with the areas where the Shortlands and Swartland soils were identified.Land adjacent and further away from the Waaihoek grid deviation consists of a similar mixture of land capability class than that within the grid deviation.

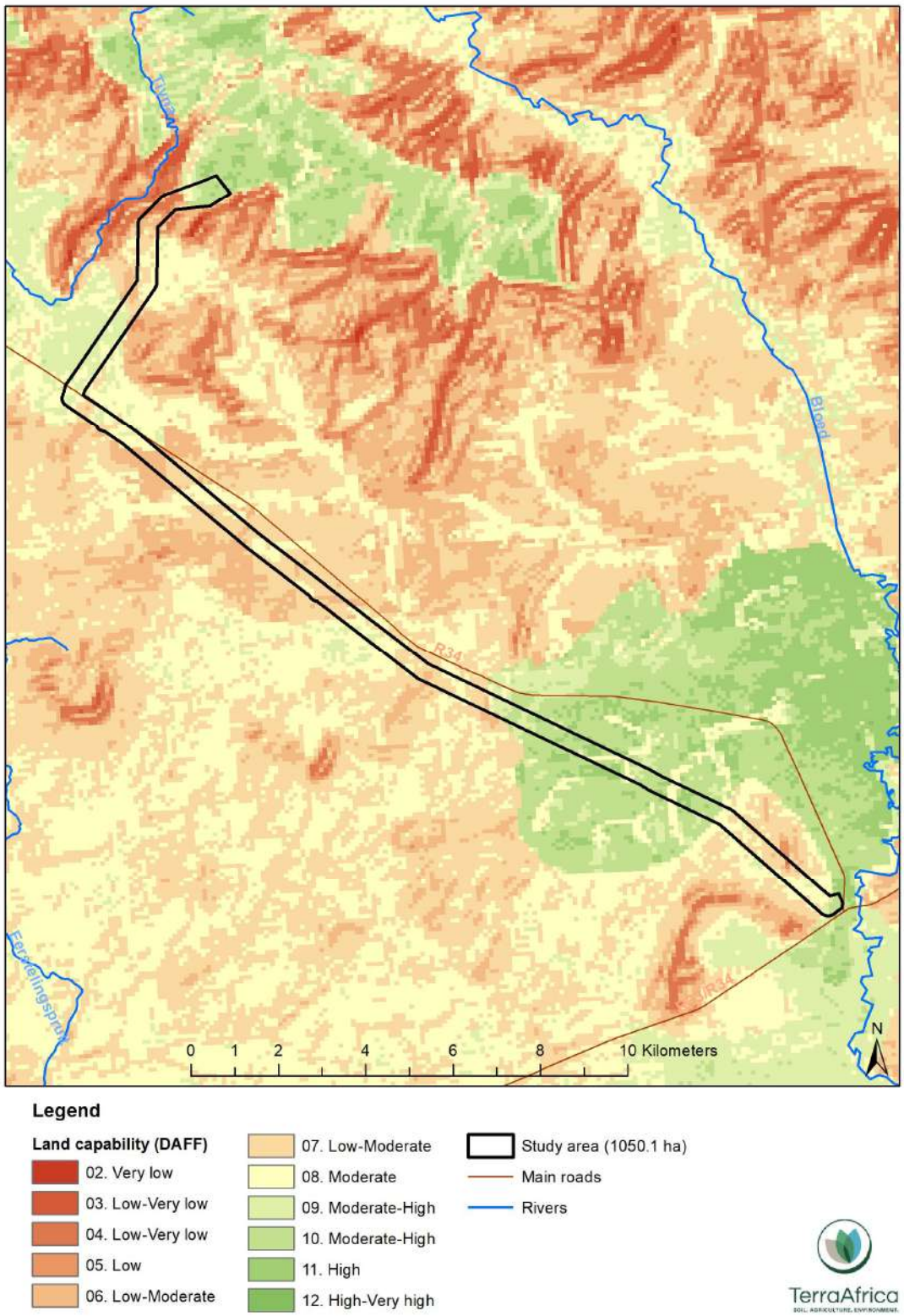

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Figure 16: Land capability classification of the Waaihoek Grid Deviation (data source: DALRRD, 2016)

9.5 Agricultural potential

Following the classification of the soil and the consideration of other factors that influence rainfed crop production, the agricultural potential of the grid deviation was determined. The agricultural potential of the area is depicted in **Error! Reference source not found.** 17.

The largest part of the Waaihoek grid deviation has moderate agricultural potential (566.1 ha) and includes the Swartland and Leptosols soil forms. Moderate-high classes were assigned to the Shortland and the Avalon soil forms. The Longlands profiles, have Low-Moderate agricultural potential. Although the profiles are deeper than the Mispah, the effective soil depth still poses limitations to the water-storage capacity of the soil profiles and can limit crop root growth. Low agricultural potential has been assigned to the Mispah soil group because of the shallow soil depth that limits root growth and water storage capacity within these profiles.

The low agricultural potential of the soils within the development area is confirmed by the few crop field boundaries within the Waaihoek grid deviation, according to DALRRD's delineation (DALRRD, 2019) (see **Figure 18**). The crop field boundaries that are present within the Waaihoek grid deviation, are no longer used for rainfed crop production. Directly southeast of the grid deviation, there are several small block areas of rainfed annual crops. Centre pivot irrigation areas (although very small) are located further southeast in the Leptosols area.

The grid assessment corridor is currently used mostly for livestock farming and cattle water troughs and handling facilities were observed within the area assessed. A small area of about 7ha that is part of a centre pivot irrigated area falls within the corridor but this area will not be affected by the footprint of the grid infrastructure.

The ideal grazing capacity is an indication of the long-term production potential of the vegetation layer growing in an area. More specifically, it relates to its ability to maintain an animal with an average weight of 450 kg (defined as 1 Large Stock Unit (LSU)), with an average feed intake of 10 kg dry mass per day over the period of approximately a year. This definition includes the condition that this feed consumption should also prevent the degradation of the soil and the vegetation. The grazing capacity is therefore expressed as number of hectares per LSU (ha/LSU) (DALRRD, 2018).

Following the metadata layer obtained from DALRRD, the long-term grazing capacity of the entire grid deviation is 5.5 ha/LSU in the southeast and 4 ha/LSU in the north west areas (see **Figure 19**). Using the long-term grazing capacity of 5.5 ha/LSU of the largest portion of the study area, the Waaihoek grid deviation can provide forage to 181 head of cattle. The grazing capacity is moderate-high.

Figure 17: Agricultural potential of the Waaihoek Grid Deviation

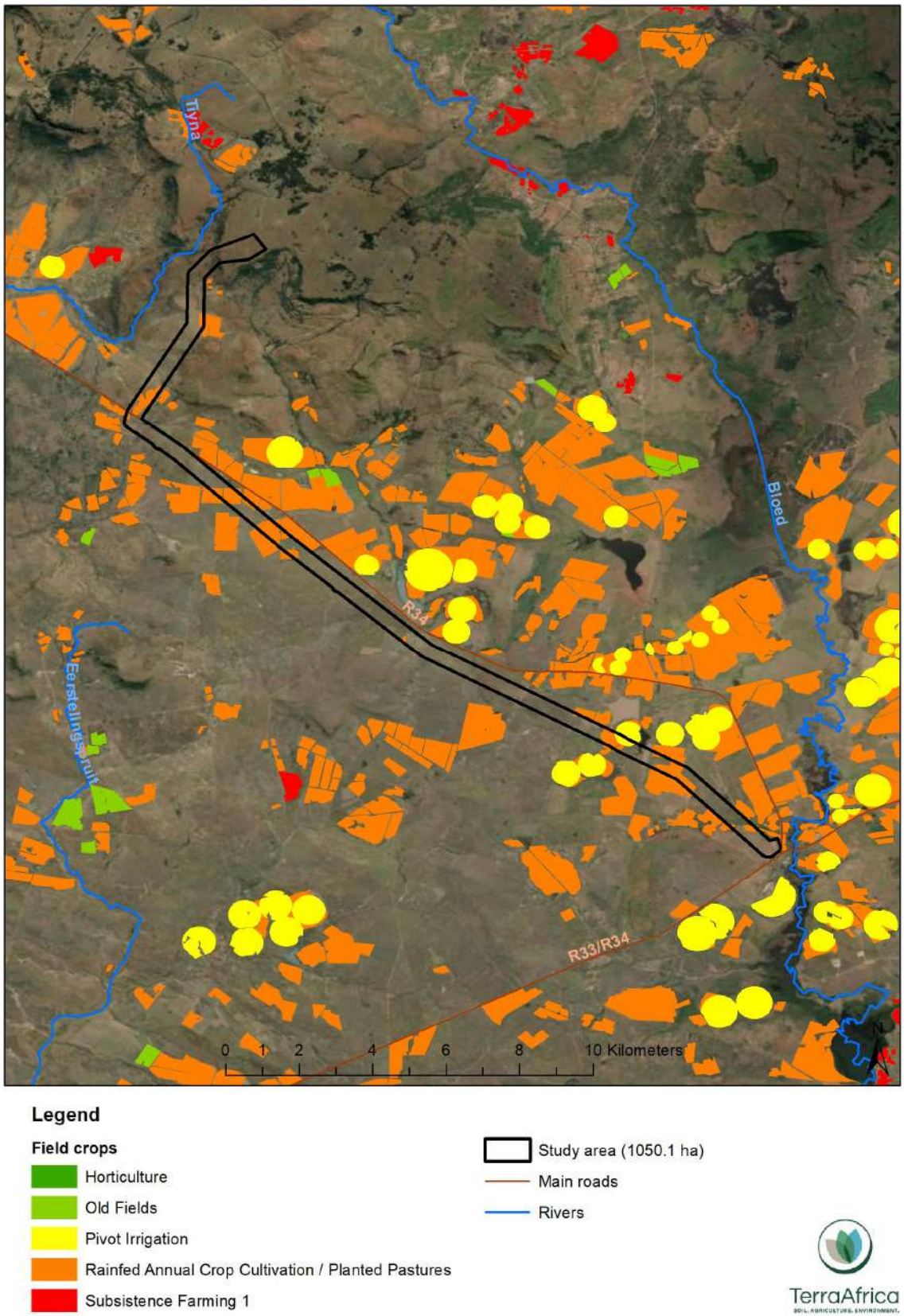

Figure 18: Position of field crop boundaries within an around the Waaihoek Grid Deviation (data source: DALRRD, 2019)

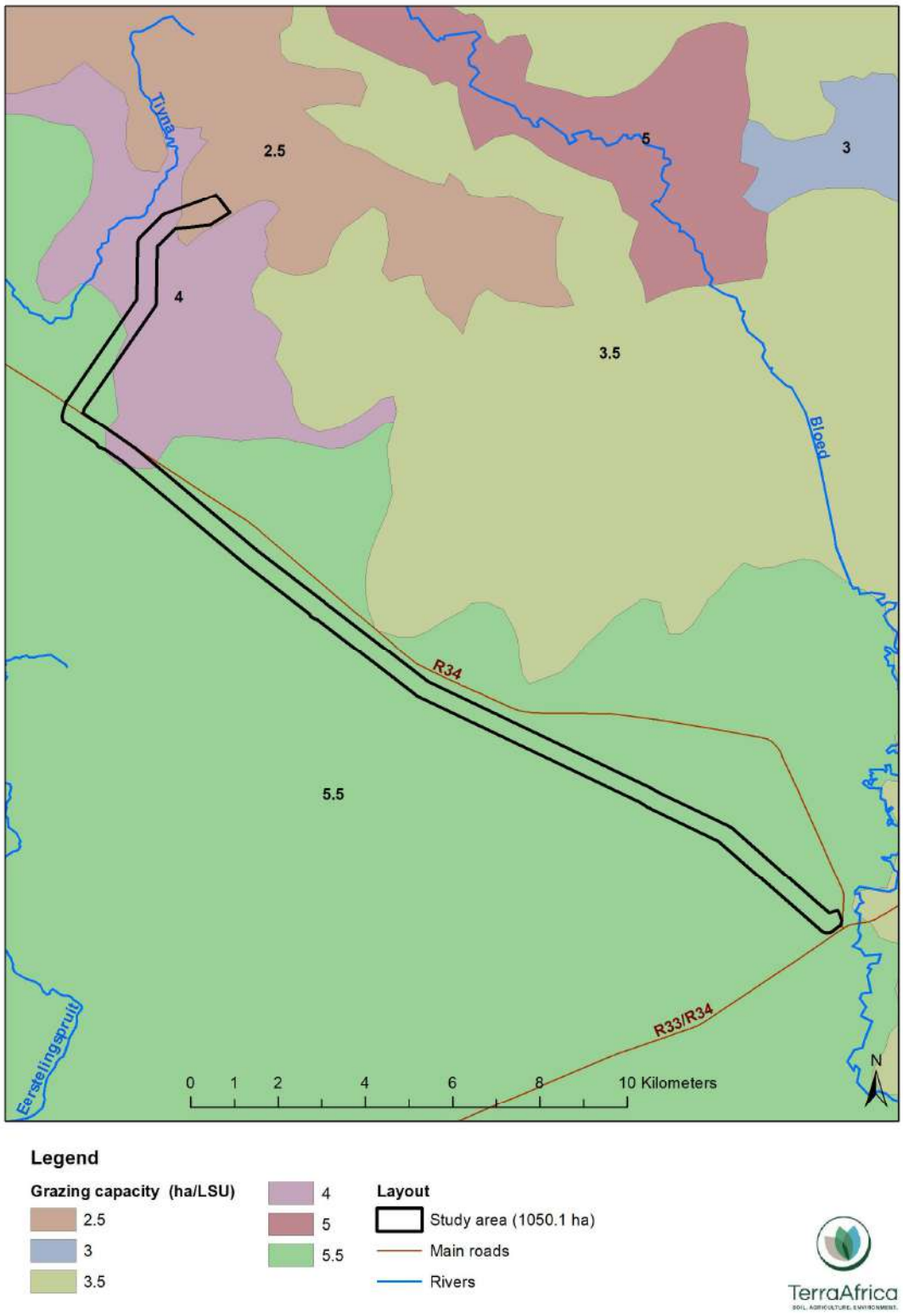

Figure 19**:** Grazing capacity of the Waaihoek Grid Deviation (data source: DALRRD, 2018).

9.6 Sensitivity analysis

The verified site sensitivity of the Waaihoek grid deviation differs from the results of the Environmental Screening Tool. The soil forms present within the grid deviation, are mainly moderately deep soils that range in depth between 500 to 1200 mm. Rock outcrops are present on the surface in small areas within the Waaihoek grid deviation. The entire area is therefore assigned Medium agricultural sensitivity, except for the 114 ha where deep Shortlands and Avalon soils are present, that has been assigned High agricultural sensitivity. The area with shallow Mispah soils at the far northern end of the grid corridor, has been assigned Low sensitivity. The sensitivity delineation is depicted in Figure **20**.

The soils in the study area have moderate depths of between 500 and 1200 mm, this indicated that the soil should be suitable for agricultural practices. Only a small portion of lands have been identified as high sensitivity area where crops were previously cultivated but has since been converted to natural veld. and the soil depths were suitable. Most of the area had moderate sensitivity as the land use for these soils are mainly livestock farming. Irrigation infrastructure, such as centre pivots, are present within the project area but only covers a very small area (7 ha). Most of the area is currently used for livestock farming and the proposed Waaihoek grid deviation, can support 181 head of cattle at the long-term grazing capacity of 5.5ha/LSU (DALRRD, 2018). However, it is not anticipated that livestock farming will be excluded from the area and livestock will be allowed to graze in the areas around the power line pylons.

Soil in the grid deviation will have Medium sensitivity, depending on the successful implementation of mitigation measures to prevent soil erosion, compaction and pollution. The significance of the impacts and mitigation measures proposed are discussed in **Section 10**.

9.7 Consideration of alternative layouts

Prior to the assessment, the project developers optimised the layout of the Waaihoek grid deviation to address previous concerns of the landowners. During the micro-siting and layout optimization process, any areas of active crop production were avoided. Although a 7ha pivot irrigation area forms part of the corridor that was assessed, the powerline will not traverse through this area and only affect areas where there is livestock grazing. It can therefore be confirmed that micro-siting and layout optimisation were successfully used to minimise the impact of the proposed project on agricultural productivity.

Figure 20: Agricultural sensitivity rating of the Waaihoek Grid Deviation

10. Impact assessment

10.1 Project description

The 25.5km power line infrastructure for the authorised Waaihoek Wind Energy Facility had previously been authorised (DEA Ref:. 14/12/16/3/3/2/654), however following consultation with Eskom and landowners, the powerline routing is proposed to be deviated outside of the previously assessed servitude in order to optimize the routing for associated with the final layout of the Waaihoek Wind Energy Facility. The proponent now proposes a deviation from this authorised route along the entire length of the powerline for approximately 25,4km. The deviation of the grid connection infrastructure is proposed in order to meet the requirements of the Bid Window 5 and meet financial close as the project has been selected as a preferred bidder.

The two components of the Waaihoek grid deviation project are the 88kV powerline and the 88kV Eskom on-site switching station. The approximate surface infrastructure footprint of these components is:

- 2425m^2 for the pylons of the powerline
- 5000m^2 for the on-site switching station

10.2 Agricultural production and employment

The area is mostly used for livestock farming and the footprint of the proposed Waaihoek grid deviation will only affect areas where there is currently livestock farming. The construction of the infrastructure will be a temporary activity and livestock will continue to graze around the pylons of the powerline. The only area that will be excluded from agriculture, is the 2425m2 of the on-site switching station, that will be fenced off.

Therefore, no agricultural production losses are anticipated. The project will also not result in any losses of agricultural employment.

10.3 Impact significance rating

The most significant impacts of the proposed project on soil and agricultural productivity will occur during the construction phase of the power line pylons and collector substation During the construction phase, the vegetation will be removed, and the soil surface prepared for the delivery of materials and erection of the infrastructure. During the operational phase, the risk remains that soil will be polluted by the waste generated or in the case of a spill incident when maintenance workers visit the area to do any maintenance work or repairs. During the decommissioning phase, soil will be prone to erosion when the infrastructure is removed from the soil surface.

Below follows the rating of the significance of each of the impacts for each of the project phases.

10.3.1 Construction phase

Impact: Reduction of land with natural vegetation for livestock grazing

Earth-moving equipment will be used to clear the vegetation all along the proposed power line alignment. In areas where obstacles such as rock outcrops are present, earth-moving equipment will be used to prepare the surface for the delivery of the construction materials.

Nature: The availability of grazing land for livestock farming will be reduced during the construction phase. It is anticipated that the significance of the impact will gradually reduce as vegetation re-establishes during the operational phase and animals can graze again around the pylons.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short duration - 2-5 years (2)	Very short duration - 0-1 years (1)
Magnitude	Low (4)	Minor (2)
Probability	Definite (4)	Probable (3)
Significance	**Low (28)**	**Low (12)**
Status (positive or negative)	Negative	Positive
Reversibility	High	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A
Mitigation: • Vegetation clearance must be restricted to areas within the servitude where the power line will be constructed. • Removal of obstacles to allow for access of construction vehicles must be kept to only where essential. • Prior arrangements must be made with the landowners to ensure that livestock are moved to areas where they cannot be injured by vehicles traversing the area. • No boundary fence must be opened without the landowners' permission. • All left-over construction material must be removed from site once construction on a land portion is completed. • No open fires made by the construction teams are allowable during the construction phase.		
Residual Impacts: The residual impact from the construction and operation of the Waaihoek grid infrastructure is considered low.		
Cumulative Impacts: Any additional power lines and other grid infrastructure that are built in the area to strengthen the electricity grid, will result in additional areas where grazing veld will be disturbed.		

Impact: Soil erosion

All areas where vegetation is removed from the soil surface in preparation for the power line construction, will result in exposed soil surfaces that will be prone to erosion. Both wind and water erosion are a risk.

Nature: The clearing and levelling of a limited area of land within the proposed power line servitude will increase the risk of soil erosion in the area. It is anticipated that the risk will naturally reduce as grass and lower shrubs re-establishes in the area once the construction has wrapped up and the operational phase continues.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)

Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (30)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A
Mitigation: • Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint/servitude; • Unnecessary land clearance must be avoided; • Level any remaining soil removed from excavation pits that remain on the surface instead of allowing small stockpiles of soil to remain on the surface. • Where possible, conduct the construction activities outside of the rainy season.		
Residual Impacts: The residual impact from the construction and operation of the Waaihoek grid infrastructure on the susceptibility to erosion is considered low.		
Cumulative Impacts: Any additional power lines and substations that are built in the area to strengthen the electricity grid, will result in additional areas where exposed to soil erosion through wind and water movement.		

Impact: Soil pollution

During the construction phase, construction workers will access the different farm portions for the preparation of the terrain and the installation of the pylons. Both potential spills and leaks from construction vehicles and equipment as well as waste generation on site, can result in soil pollution.

Nature: The following construction activities can result in the chemical pollution of the soil: 1. Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation. 2. Spills from vehicles transporting workers, equipment, and construction material to and from the construction site. 3. The accidental spills from temporary chemical toilets used by construction workers. 4. The generation of domestic waste by construction workers. 5. Spills from fuel storage tanks during construction. 6. Pollution from concrete mixing. 7. Any construction material remaining within the construction area once construction is completed. During the operational phase of the power line, maintenance and repairs can result in waste generation within the servitude area.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Low (4)	Improbable (2)
Significance	**Medium (36)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A
Mitigation:		

• Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills; • Any waste generated during construction, must be stored in designated containers and removed from the site by the construction teams. • Any left-over construction materials must be removed from site.
Residual Impacts: The residual impact from the construction and operation of the proposed project will be low to negligible.
Cumulative Impacts: Any additional power lines and substations that are built in the area where waste is not removed to designated waste sites, will increase the cumulative impacts associated with soil pollution in the area.

10.3.2 Operational phase

<u>Impact: Soil pollution</u>

Nature: During the operational phase, there can be potential spills and leaks from maintenance vehicles that transport maintenance workers and equipment. Also, any waste generated during maintenance and repairs on site can result in soil pollution.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Low (4)	Improbable (2)
Significance	**Medium (36)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A
Mitigation: • Maintenance must be undertaken regularly on all vehicles used for maintenance work to prevent hydrocarbon spills; • No domestic and other waste must be left within the grid assessment corridor by maintenance and repair workers.		
Residual Impacts: The residual impact from the operation of the Waaihoek grid infrastructure will be low to negligible.		
Cumulative Impacts: The operation of any additional infrastructure to strengthen and support the operation of the Waaihoek grid infrastructure and waste not removed to designated waste sites will increase the cumulative impacts associated with soil pollution in the area.		

10.3.3 Decommissioning phase

The decommissioning phase will have the same impacts as the construction phase i.e. soil erosion, soil compaction and soil pollution. It is anticipated that the risk of soil erosion will especially remain until the vegetation growth has re-established in the area where the project infrastructure was decommissioned.

10.4 Cumulative impact assessment and rating

"Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities[1].

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section should address whether the construction of the proposed project will result in:

- unacceptable risk;
- unacceptable loss;
- complete or whole-scale changes to the environment or sense of place; and
- unacceptable increase in impact.

The proposed Waaihoek grid infrastructure will be located within the same area as the authorised Waaihoek Wind Energy Facility (see **Figure 21**). The cumulative impacts of the proposed project in addition to the authorised facility, are rated and discussed below.

[1] Unless otherwise stated, all definitions are from the EIA Regulations 2014 (GNR 326).

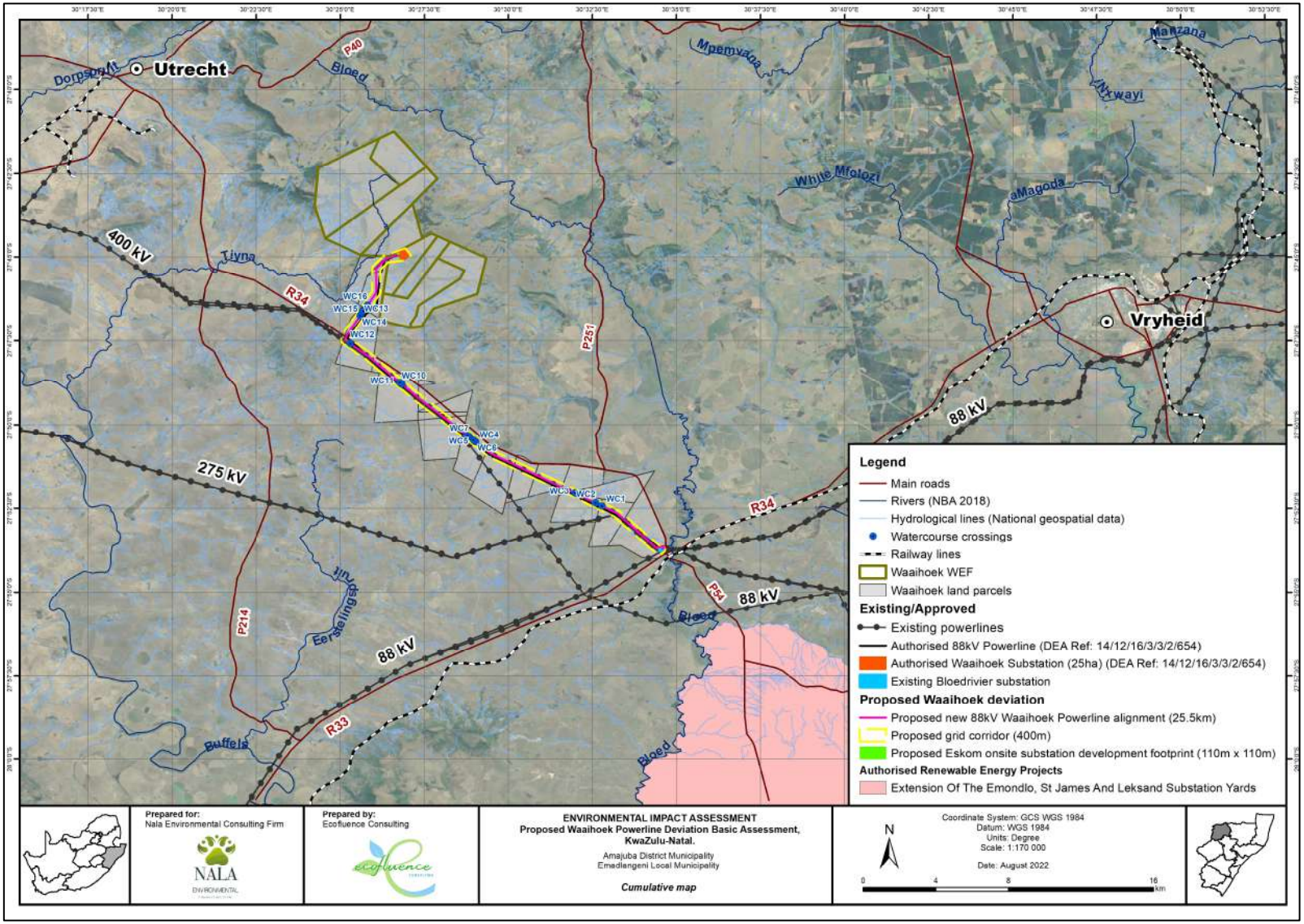

Figure 21: Renewable energy projects within a 50km radius from the proposed Waaihoek grid deviation

Table 3: Assessment of cumulative impact of decrease in areas available for livestock farming

Nature: Decrease in areas with suitable land capability for cattle farming.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Very short duration - 0-1 years (1)	Short duration – 2 – 5 years (2)
Magnitude	Minor (2)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (12)**	Low (24)
Status (positive/negative)	Negative	Negative
Reversibility	High	Low
Loss of resources?	No	Yes
Can impacts be mitigated?	N/A	No
Confidence in findings: High.		
Mitigation: The only mitigation measure for this impact is to keep the footprints of all grid infrastructure as small as possible and to manage the soil quality by avoiding far-reaching soil degradation such as erosion.		

Table 4: Assessment of cumulative impact of areas susceptible to soil erosion

Nature: Increase in areas susceptible to soil erosion		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Medium (33)**
Status (positive/negative)	Negative	Negative
Reversibility	Low	Low
Loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	No
Confidence in findings: High.		
Mitigation: Each of the projects should adhere to the highest standards for soil erosion prevention and management, as defined in Sections 10.2. above.		

Table 5: Assessment of cumulative impact of areas susceptible to soil compaction

Nature: Increase in areas susceptible to soil erosion		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	**Low (16)**	**Low (27)**
Status (positive/negative)	Negative	Negative

Reversibility	Low	Low
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation: Each of the projects should adhere to the highest standards for soil compaction prevention and management, as defined in Section 10.2 above.		

Table 6: Assessment of cumulative impact of increased risk of soil pollution

Nature: Increase in areas susceptible to soil pollution		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Medium (30)**
Status (positive/negative)	Negative	Negative
Reversibility	Low	Low
Loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	No
Confidence in findings: High.		
Mitigation: Each of the projects should adhere to the highest standards for soil pollution prevention and management, as defined in Sections 10.2 above.		

11. Mitigation and management measures

The objective of the mitigation and management measures presented below is to reduce the risk of soil degradation that will in turn affect the ability of soils within the project site to support the natural vegetation and provide ecosystem services.

<u>Prevention and management of soil erosion:</u>

Project component/s	• Construction of infrastructure • Construction of the access road
Potential Impact	Soil particles can be removed from the area through wind and water erosion
Activity/risk source	The removal of vegetation in areas where infrastructure will be constructed.
Mitigation: Target/Objective	To avoid the onset of soil erosion that can spread into other areas

Mitigation: Action/control	Responsibility	Timeframe
• Limit vegetation clearance to only the areas where the surface infrastructure will be constructed.	Environmental Officer / SHEQ division	During the entire construction, operational and decommissioning phases

• Avoid parking of vehicles and equipment outside of designated parking areas. • Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring).		

Performance Indicator	No visible signs of soil erosion around the project infrastructure
Monitoring	• Regular inspections around the constructed infrastructure to detect early signs of soil erosion developing. • When signs of erosion are detected the areas must be rehabilitated, using a combination of geo-textiles and re-vegetation to prevent the eroded area(s) from expanding.

Prevention and management of soil pollution:

Project component/s	• Construction of infrastructure • Daily activities and maintenance during the operational phase
Potential Impact	Potential fuel and oil spills from vehicles and waste generation can cause soil pollution.
Activity/risk source	• Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation. • Spills from vehicles transporting workers, equipment, and construction material to and from the construction site. • The accidental spills from temporary chemical toilets used by construction workers. • The generation of domestic waste by construction workers. • Spills from fuel storage tanks during construction. • Pollution from concrete mixing. • Pollution from road-building materials. • Any construction material remaining within the construction area once construction is completed. • Containment breaches related to the battery units and any inadvertent chemical exposure therefrom.
Mitigation: Target/Objective	To avoid soil pollution that can harm the surrounding environment and human health.

Mitigation: Action/control	Responsibility	Timeframe
• Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. • Any waste generated during construction must be stored in designated containers and removed from the site by the construction teams. • Any left-over construction materials must be removed from site.	Environmental Officer / SHEQ division	During the entire construction, operational and decommissioning phases

Performance Indicator	• No visible signs of waste and spills within the project site. • No accumulation of contaminants in the soils of the project site.
Monitoring	• Regular inspections of vehicles and equipment that enter the project site.

12. Acceptability statement

Following the data analysis and impact assessment above, the proposed Waaihoek grid deviation is considered an acceptable grid infrastructure development within the area of the grid deviation.

The soil forms present within the development area consist mostly of medium soils underlain by lithic and soft plinthic material or rock that has severe limitations to rainfed crop production. These soils are of the Mispah and Longlands forms.

The soils in the study area have moderate depths of between 500 and 1200 mm, this indicated that the soil should be suitable for agricultural practices. This being said only a small portion of lands have been identified as high sensitivity area where crops were grown and the soil depths were suitable. The majority of the area had moderate sensitivity as the land use for these soils are mainly livestock farming. Irrigation infrastructure, such as centre pivots, are present within the project area, although very small (7 ha). The majority of the area is currently used for livestock farming and the proposed Waaihoek grid deviation, can support 181 head of cattle at the long-term grazing capacity of 5.5ha/LSU (DALRRD, 2018). However, it is not anticipated that livestock farming will be excluded from the area and livestock will be allowed to graze in the areas around the power line pylons.

It is anticipated that the construction phase will have impacts that range from medium to low and that through the consistent implementation of the recommendation mitigation measures, these impacts can all be reduced to low. Impacts during the operational phase are associated with possible repairs that may be required to maintain the power line.

It is my professional opinion that this application be considered favorably as the grid deviation are considered to be acceptable, permitting that the mitigation measures are followed to prevent soil erosion and soil pollution and to minimize impacts on the veld quality of the farm portions that will be affected. The project infrastructure should also remain within the servitude area within which the power line will be constructed.

13. Reference list

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APPENDIX 1 – DECLARATION OF INDEPENDENCE AND SPECIALIST DETAILS

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

PROPOSED ROUTE DEVIATION OF THE AUTHORISED 88KV POWERLINE AND DEVELOPMENT OF THE ESKOM PORTION OF THE ON-SITE SUBSTATION FOR THE WAAIHOEK WIND ENERGY FACILITY, EMADLANGENI LOCAL MUNICIPALITY (AMAJUBA DISTRICT), KWA-ZULU NATAL PROVINCE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

Details of Specialist, Declaration and Undertaking Under Oath

Page 1 of 3

1. SPECIALIST INFORMATION

Specialist Company Name:	TerraAfrica Consult CC			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Mariné Pienaar			
Specialist Qualifications:	MSc. Environmental Science (Wits) ; BSc. (Agric) Plant Production (UP)			
Professional affiliation/registration:	SACNASP Registration No:400274/10 Soil Science Society of South Africa ; IAIAsa			
Physical address:	Farm Strydpoort 403, Ottosdal, 2610			
Postal address:	P.O. Box 433, Ottosdal			
Postal code:	2610	Cell:	082 828 3587	
Telephone:	082 828 3587	Fax:	N/A	
E-mail:	mpienaar@terraafrica.co.za			

2. DECLARATION BY THE SPECIALIST

I, Mariné Pienaar, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

TerraAfrica Consult

Name of Company:

2022-07-08

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Mariné Pienaar, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

TerraAfrica Consult CC

Name of Company

2022-07-08

Date

Signature of the Commissioner of Oaths

08/07/2022

Date

08/07/2022

Commissioner of Oaths (RSA)
Stephanus Francois Kasselman
59 Kruger street Wolmaransstad 2630
T: 018 596 1320 F: 018 596 1395

Details of Specialist, Declaration and Undertaking Under Oath

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APPENDIX 2 - CURRICULUM VITAE OF SPECIALIST

MARINÉ PIENAAR

Specialist Scientist

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linkedin.com/in/marinepienaar

Wolmaransstad,
South Africa

EXPERTISE

Soil Quality Assessment

Soil Policy and Guidelines

Agricultural Agro-Ecosystem Assessment

Sustainable Agriculture

Data Consolidation

Land Use Planning

Soil Pollution

Hydropedology

EDUCATION

MASTER'S DEGREE
Environmental Science
University of Witwatersrand
2010 – 2018

BACHELOR'S DEGREE
Agricultural Science
University of Pretoria
2001 – 2004

PROFESSIONAL PROFILE

I contribute specialist knowledge on agriculture and soil management to ensure long-term sustainability of projects in Africa. For the past thirteen years, it has been my calling and I have consulted on more than 200 projects. My clients include environmental and engineering companies, mining houses, and project developers. I enjoy the multi-disciplinary nature of the projects that I work on and I am fascinated by the evolving nature of my field of practice. The next section provide examples of the range of projects completed. A comprehensive project list is available on request.

PROJECT EXPERIENCE

Global Assessment on Soil Pollution

Food and Agricultural Organisation (FAO) of the United Nations (UN)

Author of the regional assessment of Soil in Sub-Saharan Africa. The report is due for release in February 2021. The different sections included:

- Analysis of soil and soil-related policies and guidelines for each of the 48 regional countries
- Description of the major sources of soil pollution in the region
- The extent of soil pollution in the region and as well as the nature and extent of soil monitoring
- Case study discussions of the impacts of soil pollution on human and environmental health in the region
- Recommendations and guidelines for policy development and capacitation to address soil pollution in Sub-Saharan Africa

Data Consolidation and Amendment

Range of projects: Mining Projects, Renewal Energy

These projects included developments where previous agricultural and soil studies are available that are not aligned with the current legal and international best practice requirements such as the IFC Principles. Other projects are expansion projects or changes in the project infrastructure layout. Tasks on such projects include the incorporation of all relevant data, site verification, updated baseline reporting and alignment of management and monitoring measures.

Project examples:

- Northam Platinum's Booysendal Mine, South Africa
- Musonoi Mine, Kolwezi District, Democratic Republic of Congo
- Polihali Reservoir and Associated Infrastructure, Lesotho
- Kaiha 2 Hydropower Project, Liberia
- Aquarius Platinum's Kroondal and Marikana Mines

MARINÉ PIENAAR

Specialist Scientist

PROFESSIONAL MEMBERSHIP

South African Council for Natural Scientific Professions (SACNASP)

Soil Science Society of South Africa (SSSSA)

Soil Science Society of America (SSSA)

Network for Industrially Contaminated Land in Africa (NICOLA)

LANGUAGES

English (Fluent)

Afrikaans (Native)

French (Basic)

PRESENTATIONS

There is spinach in my fish pond
TEDx Talk
Available on YouTube

Soil and the Extractive Industries
Session organiser and presenter
Global Soil Week, Berlin (2015)

How to dismantle an atomic bomb
Conference presentation (2014)
Environmental Law Association (SA)

PROJECT EXPERIENCE (Continued)

Agricultural Agro-Ecosystem Assessments

Range of projects: Renewable Energy, Industrial and Residential Developments, Mining, Linear Developments (railways and power lines)

The assessments were conducted as part of the Environmental and Social Impact Assessment processes. The assessment process includes the assessment of soil physical and chemical properties as well as other natural resources that contributes to the land capability of the area.

Project examples:

- Mocuba Solar PV Development, Mozambique
- Italthai Railway between Tete and Quelimane, Mozambique
- Lichtenburg PV Solar Developments, South Africa
- Manica Gold Mine Project, Mozambique
- Khunab Solar PV Developments near Upington, South Africa
- Bomi Hills and Mano River Mines, Liberia
- King City near Sekondi-Takoradi and Appolonia City near Accra, Ghana
- Limpopo-Lipadi Game Reserve, Botswana
- Namoya Gold Mine, Democratic Republic of Congo

Sustainable Agriculture

Range of projects: Policy Development for Financial Institutions, Mine Closure Planning, Agricultural Project and Business Development Planning

Each of the projects completed had a unique scope of works and the methodology was designed to answer the questions. While global indicators of sustainable agriculture are considered, the unique challenges to viable food production in Africa, especially climate change and a lack of infrastructure, in these analyses.

Project examples:

- Measurement of sustainability of agricultural practices of South African farmers – survey design and pilot testing for the LandBank of South Africa
- Analysis of the viability of avocado and mango large-scale farming developments in Angola for McKinsey & Company
- Closure options analysis for the Tshipi Borwa Mine to increase agricultural productivity in the area, consultation to SLR Consulting
- Analysis of risks and opportunities for farm feeds and supplement suppliers of the Southern African livestock and dairy farming industries
- Sustainable agricultural options development for mine closure planning of the Camutue Diamond Mine, Angola

MARINÉ PIENAAR

Specialist Scientist

PROFESSIONAL DEVELOPMENT

Contaminated Land Management 101 Training
Network for Industrially Contaminated Land in Africa
2020

Intensive Agriculture in Arid & Semi-Arid Environments
CINADCO/MASHAV R&D Course, Israel
2015

World Soils and their Assessment Course
ISRIC – World Soil Information Centre, Netherlands
2015

Wetland Rehabilitation Course
University of Pretoria
2010

Course in Advanced Modelling of Water Flow and Solute Transport in the Vadose Zone with Hydrus
University of Kwazulu-Natal
2010

Environmental Law for Environmental Managers
North-West University Centre for Environmental Management
2009

PROJECT EXPERIENCE (Continued)

Soil Quality Assessments

Range of projects: Rehabilitated Land Audits, Mine Closure Applications, Mineral and Ore Processing Facilities, Human Resettlement Plans

The soil quality assessments included physical and chemical analysis of soil quality parameters to determine the success of land rehabilitation towards productive landscapes. The assessments are also used to understand the suitability for areas for Human Resettlement Plans

Project examples:

- Closure Planning for Yoctolux Colliery
- Soil and vegetation monitoring at Kingston Vale Waste Facility
- Exxaro Belfast Resettlement Action Plan Soil Assessment
- Soil Quality Monitoring of Wastewater Irrigated Areas around Matimba Power Station
- Keaton Vanggatfontein Colliery Bi-Annual Soil Quality Monitoring

REFERENCES

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APPENDIX 3 – PROOF OF SACNASP REGISTRATION OF SPECIALIST

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Mariné Pienaar

Registration Number: 400274/10

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Soil Science (Professional Natural Scientist)
Agricultural Science (Professional Natural Scientist)

Effective **20 October 2010** Expires **31 March 2023**

Chairperson

Chief Executive Officer

To verify this certificate scan this code