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## Amendment Report for the Agricultural Assessment of the Zen Wind Farm in the Western Cape Province

Submitted by TerraAfrica Consult cc

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## 1. Introduction

The authorised Zen Wind Farm is located approximately 10km northwest of the town Gouda and falls within the Drakenstein Local Municipality in the Cape Winelands District Municipality, Western Cape. An Environmental Authorisation (EA) for the Zen Wind Farm and associated infrastructure was received on 03 November 2016.

The Zen Wind Farm is to be constructed within the project site which comprises the following farm portions:

- Portion 1 of the Farm Bonne Esperance 83,
- Portion 2 of the Farm Bonne Esperance 83,
- Portion 9 of the Farm No. 88
- Portion 0 of the Nayoth 458

Due to the proximity to the Bergriver Wind farm and the operational Gouda Wind Farm, Acciona Energy South Africa Global (Pty) Ltd (AESAG) acquired the project from the original developers and is developing a wind farm cluster. AESAG will adopt the latest wind turbine technology available to Acciona Energy for the project. The facility layout has been designed to optimise the energy yield and considers the latest technology. The project will also utilise combined construction infrastructure (temporary facilities, laydown areas, batch plants to further reduce the overall impacts of the project and the adjacent Bergriver Wind Farm. Both the Zen and the Bergriver Wind Farm projects are designed to share infrastructure to optimise construction expenses and timeline.

In this regard, the following is proposed:

1. Reduction in the number of turbines from 27 to 17;
2. Increase turbine capacity from 6 MW to up to 7.5 MW per turbine
3. Increase the internal roads width from 6m to ~8m
4. Optimise turbine/facility layout based on the energy yield, and revise the layout as required based on the revised turbine numbers and turbine specification; and
5. Optimise internal underground cabling (33kV) to enable a consolidated point of grid connection for the Zen/Bergriver cluster, and remove substation and overhead power line connection from the project description.

The proposed amendments are not listed activities and do not trigger any new listed activity. No additional properties will be affected by the amendments as the proposed amendments are within the originally authorised development footprint. In addition to the above, the final facility layout and the EMPr for the facility must be submitted and approved prior to commencement of construction, as per the requirements of the EA.

Terra-Africa Consult cc was appointed by Savannah Environmental (Pty) Ltd (Savannah) to assess the proposed amendments of the Zen Wind Farm in relation to its impact on the agricultural properties and productivity of the project site. The results of the assessment, described in this report, will be submitted with the final facility layout and the EMPr.



## 2. Terms of Reference

The Terms of Reference for the assessment aims to clarify whether the proposed changes in the infrastructure layout of the Zen Wind Farm will:

- Increase the significance of impacts originally identified in the EIA report or lead to any additional impacts; or
- Have a zero or negligible effect on the significance of impacts identified in the EIA report; or
- Lead to a reduction in significance of any of impacts identified in the EIA report.

Therefore, the Terms of Reference for the Agricultural Amendment Assessment stipulates that the study must include the following:

- A field survey to confirm the current status of agricultural resources and compare that to the description of the agricultural resources (baseline) of the original assessment;
- A statement on whether the impact rating as provided in the initial assessment remains valid and if the mitigation measures provided in the initial assessment are still applicable;
- An indication of any new mitigation measures which need to be included into the EA, should the request to extend the commencement period be granted by the Department;
- An indication of any new assessments/guidelines which are now relevant to the authorised development which were not undertaken as part of the initial assessment;
- A description and assessment of any changes to the agricultural resources that has occurred since the initial EA was issued;
- A description and an assessment of the surrounding environment, in relation to new developments or changes in land use which might impact on the authorised project (cumulative impact assessment).
- Measures to ensure avoidance, management and mitigation of impacts associated with such proposed changes, and any changes to the Environmental Management Programme (EMPr).



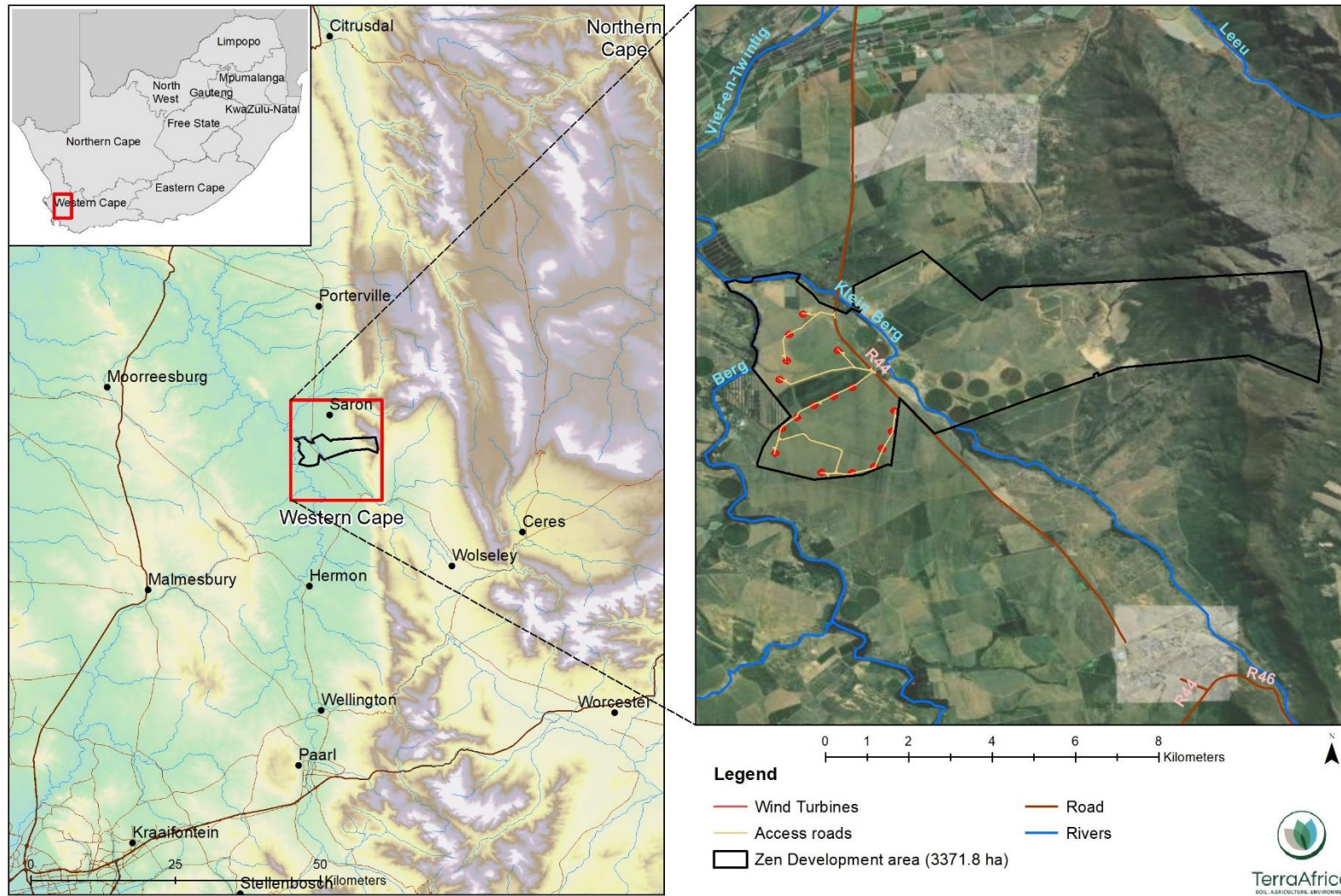


Figure 1: Locality of the authorised Zen Wind Farm in the Western Cape Province



### 3. Details of the specialist

Mariné Pienaar 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.

### 4. Project description

The Zen Wind Farm project site is proposed to accommodate the following infrastructure:

- Up to 17 wind turbines at 7.5MW each with a tip height of up to 230m.
- Concrete turbine foundations and turbine hardstands;
- Internal access roads (up to 8m in width) linking wind turbines and other infrastructure on the Bergriver Wind Farm site.

Table 1 summarises the details or dimensions of the Zen Wind Farm and associated infrastructure and Figure 2 indicates the position of the infrastructure within the project site.

Table 1: Details and dimensions of Zen Wind Farm and associated infrastructure

<b>Infrastructure</b>	<b>Footprint and dimensions</b>
Facility capacity	Contracted capacity of up to 147MW
Number of turbines	Up to 17 turbines
Turbine tip height	Up to 230m
Turbine foundations	Approximately 20m x 20m to a depth of 6m per turbine
Access and internal roads	Existing roads on farm will be used where feasible and practical. The width of the access road will be approximately 8m (this is also relevant for existing roads) however during construction access roads may be up to 10m in width. The total length of access roads is approximately. The access roads will be gravel.
Underground cabling	Underground cabling between the turbine will be installed at a depth of 1.5m to 3m. Cabling to follow internal access roads.



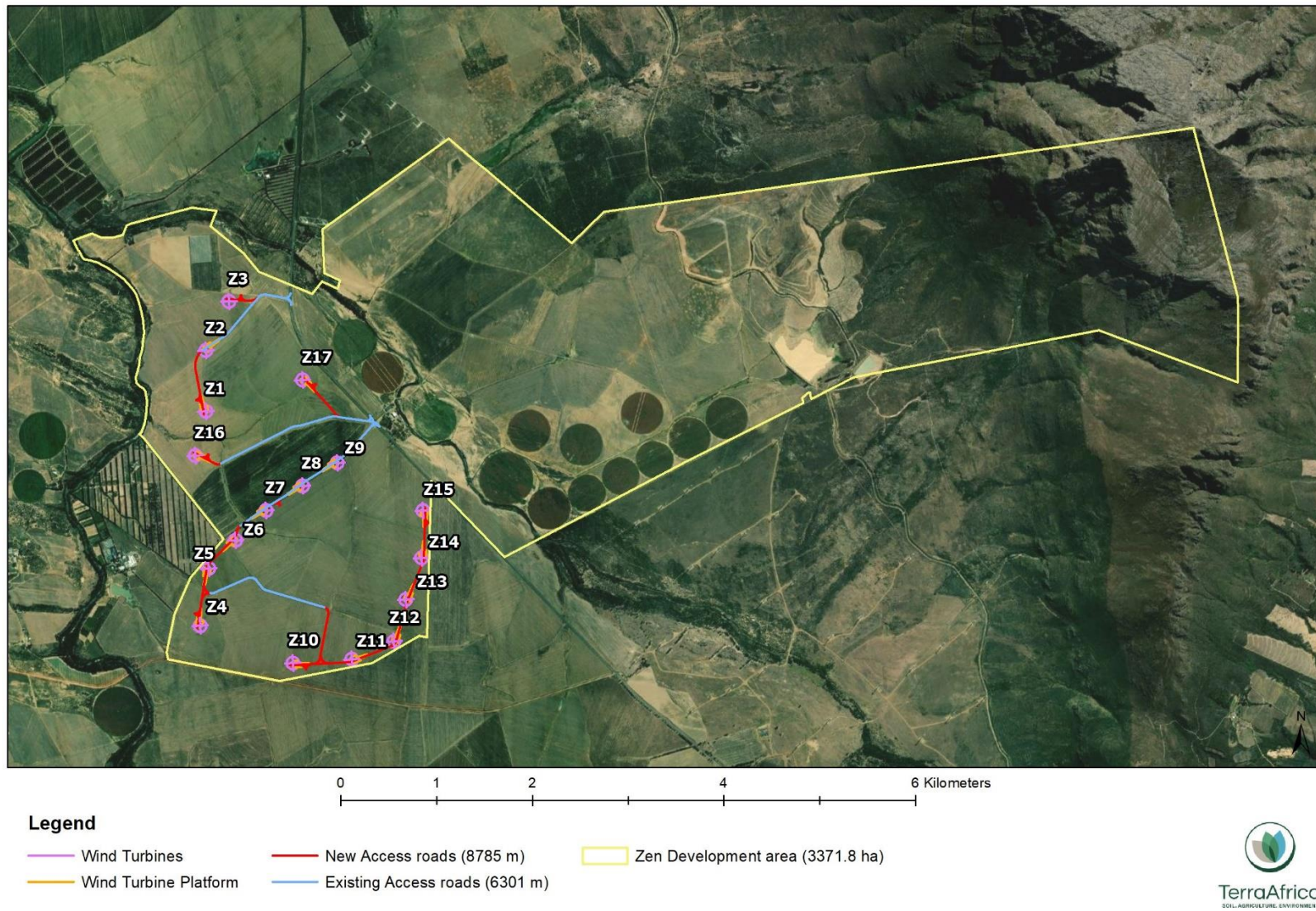


Figure 2: Final proposed amended infrastructure layout for the Zen Wind Farm





The Zen Wind Farm and Bergriver Wind Farm will share the following infrastructure:

- Temporary facilities, laydown areas and batch plants
- Onsite Substation and Switching Substation
- Operation and Maintenance buildings including a gate house, security building, control centre, offices, warehouses, a workshop and visitors centre.

The shared infrastructure is located within the Bergriver Wind Farm project site and do not impact on any land within the Zen Wind Farm project site.

## 5. Methodology

The different steps that were followed to gather the information used for the compilation of this report is outlined below.

### 5.1 Review of initial assessment

Prior to the site visit, the original assessment for the project site, was reviewed. The original assessment was conducted and submitted by J.H. van der Waals of Terra Soil Science (January 2012). The data and findings are described in the final Agriculture Potential Survey: Proposed Ventusa Wind Energy Facility, Gouda, Western Cape Province. This assessment was part of the initial EA process and contains information on the soil and agricultural resources of the project site as well as the impact assessment of the original infrastructure layout. Since the submission of this report, the project name has been changed to the Zen Wind Farm but the project site boundaries remain unchanged.

For the original assessment, the project site was surveyed on 4 January 2012 (Van der Waals 2012). The survey was a reconnaissance level soil survey that was done to verify the soil and land type data that was assessed in a desktop assessment that preceded the site visit. Following the site visit, the soil and agricultural potential maps were developed, and the results interpreted to delineate zones of agricultural sensitivity for the project site. The maps and results are presented in the original assessment report.

### 5.2 Desktop assessment of new infrastructure layout

The new infrastructure layout was evaluated prior to the site visit to determine whether the new layout is located on soil with High agricultural sensitivity. The total surface footprint of the new infrastructure layout was calculated to determine whether it still falls within the Allowable Development Limits for Renewable Energy Projects, as stipulated in GNR 320 of NEMA.

### 5.3 Site assessment

To determine whether any changes to the baseline agricultural resources occurred since the initial assessment was compiled, the Zen Wind Farm project site was visited on 11 April 2023.



The site was traversed by vehicle and on foot and the current land uses and surrounding land uses were documented. Soil was classified at 16 observation points around the surface footprint of the amended to verify the data of the initial assessment. The soil profiles were examined to a maximum depth of 1.5m using a hand-held auger. Observations on site were made regarding soil texture, structure, colour and soil depth at each survey point. Photographic evidence of soil properties and current land uses were taken with a digital camera.

#### 5.4 Impact assessment methodology

Following the methodology prescribed by Savannah, both the direct impacts of the proposed amendments, as well as the cumulative impacts in relation to other renewable energy projects in the area, 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).

## 6. New assessment guidelines

The original assessment by Van der Waals (2012) for the Gouda Wind Farm followed the requirements of Appendix 6 of the Environmental Impact Assessment Regulations of the National Environmental Management Act (No. 107 of 1998) (from here onwards referred to as NEMA). Since the project was authorised, the protocols for Agricultural Assessment for Renewable Energy Projects, as outlined in Government Notice 320 of 2020 (GNR 320), was published. This Notice provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of

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 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.

This report uses the requirements of GNR 320 as reporting guidelines and provides information that is required but that were not provided in the previous assessment.



## 7. Comparative assessment of baseline

### 7.1 Soil

#### 7.1.1 Initial assessment

The initial assessment by Terra Soil Science (Van der Waals, 2012), stated that the project site consists of three different soil zones. These zones are shallow duplex soils, shallow rocky soils with rock outcrops and alluvial sand soils. According to this report, the area with shallow duplex soils consists of soils of the Swartland, Estcourt, Sterkspruit, Valsrivier and Glenrosa forms. These soils typically have bleached topsoil with a high fraction of fractured rock and lithic material in the horizon underneath the topsoil. The depth of these soils are shallow and the soils are also prone to erosion.

The second soil group consists of shallow, rocky soils with rock outcrops. These are present in the mountainous area in the eastern part of the project site as well as the footslopes of the mountains. This group consists of Mispah and Glenrosa soils. The third group of soils are the alluvial sandy soils that are present in the floodplain of the Klein Berg River as well as around the stream channels of the Klein Berg River. This soil group consists of Dundee, Oakleaf, Namib and Fernwood soil forms.

#### 7.1.2 Site verification for amended layout

Following the site visit of 11 April 2023, it is concluded that the soil properties have remained unchanged since the previous assessment by Terra Soil Science (Van der Waals, 2012). The amended layout falls entirely on soils that were classified as shallow duplex soils in the initial assessment. During the verification visit, mostly Glenrosa profiles were identified in the area of the amended layout. These profiles range in depth between 100 and 450 mm and the orthic topsoil is underlain by geolithic material (see Figure 3). In some areas Mispah soils are present. The Mispah soils range in depth between 50 and 300 mm and the depth is limited by solid and fractured rock instead of lithic material.

Slight depressions in the fields consist of duplex soils and the higher clay content of these soils result in higher water-holding capacity and slower water infiltration rate. During the site visit on 11 April 2023, a few of these depressions with stagnant water were observed. These areas have likely developed as a result of erosion over time as the duplex soils are highly erodible.

Duplex soils that were identified in these areas are Swartland soils. The Swartland soils consist of orthic topsoil that is mostly grey or bleached in colour and brown pedocutanic subsoil that has some vertic properties. The Swartland soils range in depth between 0.3 and 0.5m and is limited in effective depth by lithic material. The pedocutanic horizon is non-calcareous.





Figure 3: Shallow Glenrosa profile with a prominent geolithic subsoil horizon



Figure 4: Slight depressions with duplex soils and stagnant water in the wheat fields of the project site



## 6.2 Agricultural potential

### 6.2.1 Initial assessment

The original assessment found that the agricultural potential of the site is limited by the shallow and duplex nature of the soils and that the key determinants for successful crop production, are sufficient rainfall and management (Van der Waals, 2012). The shallow soils have limited water-holding capacity and may restrict root development while the duplex soils are highly erodible. The areas of shallow duplex soils have been delineated as “high agricultural potential” in the northern part and “medium agricultural potential” in the southern part. However, the report does not state why the distinction has been made when soils fall within the same classification group.

### 6.2.2 Site verification for amended layout

Since the soil forms of the Zen Wind Farm project site have remained unchanged, the agricultural potential assigned to these soil forms during the original assessment, also remains the same. None of the areas previously used for rainfed production during the initial assessments have been converted to irrigated farming and therefore the yield potential remains the same. The proposed amended layout of the Zen Wind Farm was evaluated and the new infrastructure layout will fall either on soils with High agricultural potential (according to the delineation by Van der Waals, 2012) or Medium agricultural potential. During the site visit, the landowner was applying soil amendments to maintain or improve the agricultural potential of the soils.



Figure 5: Application of soil amendments to the wheat fields (as seen on 11 April 2023)



## 6.3 Land use

### 6.3.1 Initial assessment

The original assessment report indicated that the farmer stated that the main land use within the Bergriver project site is rainfed wheat production during the winter season (rainy season) (Van der Waals, 2012). Cattle production is a secondary land use and cattle graze the harvested wheat stalks that remains in the fields after the harvest. The report also stated that sand was mined on the banks of the Klein Berg River.

The surrounding land uses were not discussed in the original report.

### 6.3.2 Site verification for amended layout

The land uses within the Zen project site have remained unchanged. The dominant land use is still rainfed wheat production with cattle farming as a secondary land use. During the site visit of 11 April 2023, old wheat stalks that remained in the fields after the previous harvest, were observed. Some fields have already been tilled and earthmoving equipment was seen distributing soil amendments into the fields (**Figure 5**). The fields were accessed by unsurfaced gravel access roads (**Figure 6**). There are centre pivot irrigated fields located east of the Klein Berg River and these pivots are mainly used for the production of pastures. All the infrastructure components of the amended layout is either located in the fields where wheat produced on the western side of the project site (west of the R44), or are access roads that already existed.



Figure 6: Wheat stalks that remained in the crop fields after the last harvest



The main surrounding land uses include wheat farming as well as smaller areas of canola farming. The project site of the existing Gouda Wind Farm is located nearby, on properties to the south of the site. An area that borders on the north-western part of the site, that consisted of overhead irrigation, is no longer used and the remains of the infrastructure was observed. It is unknown whether this area will be used again for irrigated agriculture.



Figure 7: Remains of an irrigated field just outside the Zen Wind Farm project site

## 6.4 Sensitivity analysis

### 6.4.1 Initial assessment

The original assessment found that Zen Wind Farm project site can be classified into three different categories of agricultural sensitivity, i.e., Low, Medium, and High (Van der Waals, 2012). A fourth category was delineated as “Sensitivity” although this area consisted of a combination of flood plains, mountainous areas and agricultural fields, so it is uncertain why it was grouped together.

Shallow duplex soils west of the Klein Berg River were assigned High and Medium sensitivity while the same soils that are east of the Klein Berg River, were assigned Low sensitivity. The rationale for this sensitivity rating is not explained in the original specialist report. The remaining areas, including the shallow rocky soils and rock outcrops as well as the alluvial sandy soils, were classified as Sensitive.





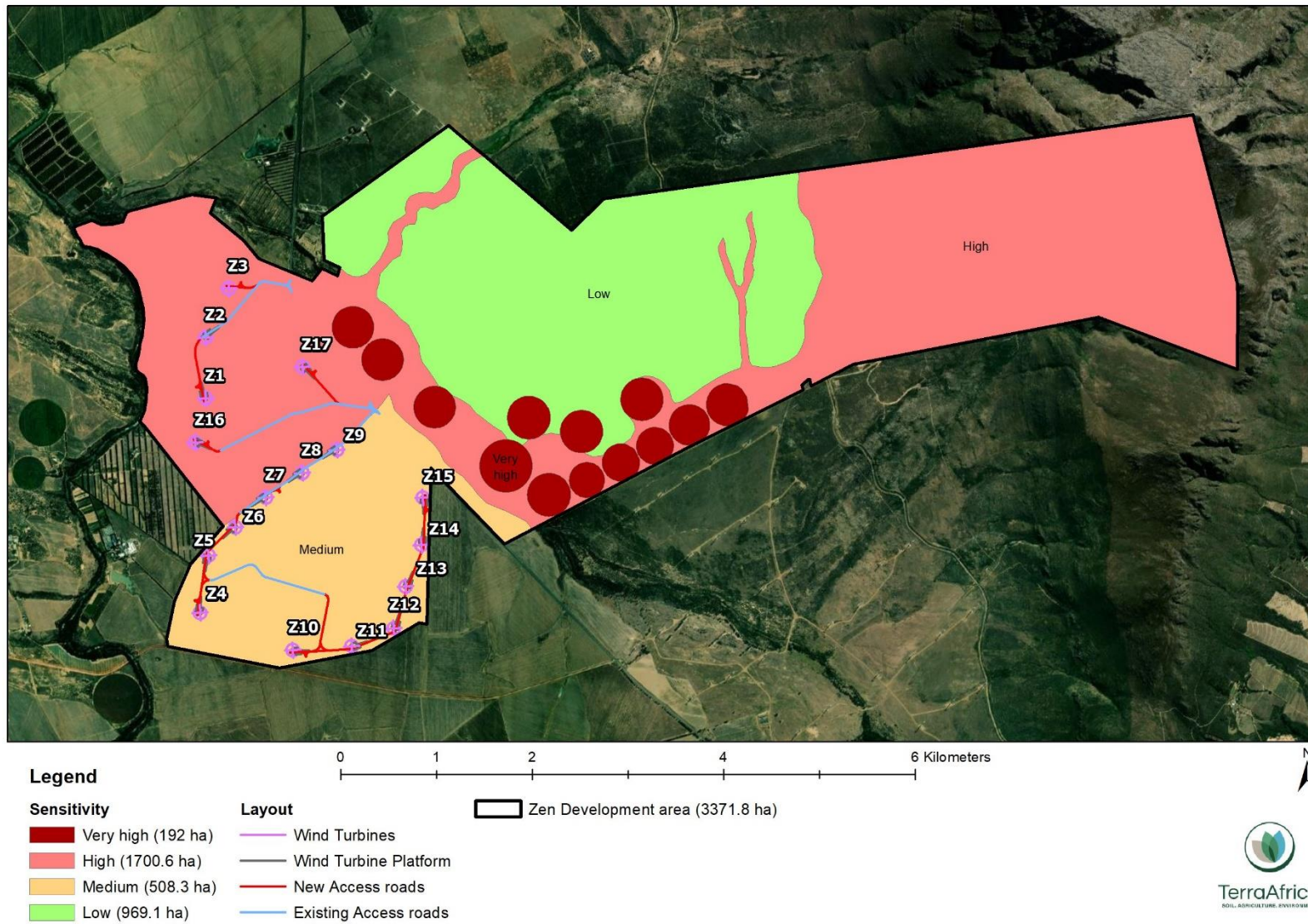


Figure 8: Amended layout for the Zen Wind Farm superimposed on the verified sensitivity of the Zen Wind Farm project site



#### 6.4.2 Site verification for amended layout

Following the latest assessment of the project site, and in alignment with the criteria of GNR 320, the project site was divided into all four agricultural sensitivity categories. The areas with Medium and Low agricultural sensitivity remained the same as that delineated by Terra Soil Science (Van der Waals, 2012). However, the areas classified as “Sensitivity” were re-classified to align with the four classes outlined in the GNR 320. All the pivot irrigation areas were delineated as having Very high agricultural sensitivity. The remaining areas are included in the High sensitivity category. Apart from the updates to the sensitivity delineation, the rest of the area’s sensitivity remains unaltered as there are no changes in soil properties or agricultural potential since the previous assessment.

The amended layout of the project’s infrastructure will affect land with Medium and High agricultural sensitivity as can be seen in Figure 8. No areas with Very high sensitivity are affected by the infrastructure.

The verified sensitivity delineation of the surface footprint area differs from the agricultural sensitivity as provided by the screening tool. According to the screening tool, the largest part of the area consists of land with High agricultural sensitivity because of rainfed crop cultivation and Moderate-High (Class 09 and 10) land capability (Figure 9). The baseline information on soil and agricultural potential as discussed above, only partially agrees with this rating and indicates that the southern part of the site should rather be rated as Medium sensitivity.



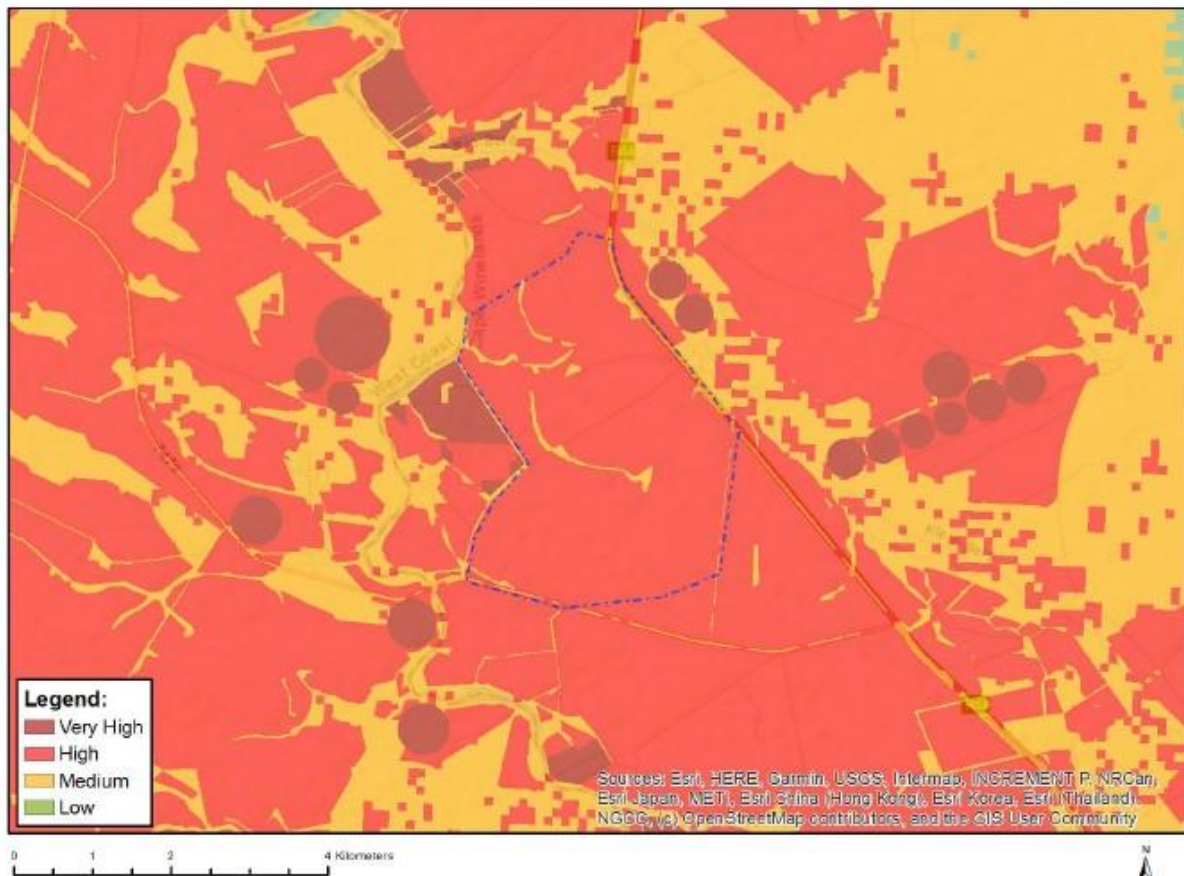


Figure 9 Agricultural sensitivity as depicted by the screening tool report (generated by Savannah on 10 March 2023)

## 8. Allowable development limits

GNR 320 provides Allowable Development Limits for renewable energy generation developments of 20MW or more. The allowable development limits refer to the area of a particular land capability that can be directly impacted by a renewable energy development. According to GNR 320, the physical footprint for the calculation of these limits are defined as “the area directly occupied by all infrastructure, including roads, hard standing areas, buildings, substations, etc. that is associated with the renewable energy generation facility during its operational phase, and that result in the exclusion of that land from potential cultivation or grazing. It excludes all areas that were already occupied by roads and other infrastructure prior to the establishment of the renewable energy facility, but includes the surface area required for expanding existing infrastructure (e.g. widening existing roads).”

### 7.1.1 Initial assessment

The original assessment was completed in 2012, before there was any requirement for the calculation of allowable development limits. Therefore, the allowable development calculation for the original infrastructure layout, is not available.



### 7.1.2 Amended infrastructure layout

All infrastructure of the amended layout is located in crop fields with either High or Medium agricultural sensitivity. The surface footprint of the amended layout that must be considered for the allowable development limits, is 8.96ha. This consists of 17 wind turbines with each wind turbine platform about 400m<sup>2</sup>, affecting a total area of 6800m<sup>2</sup>. It includes for the permanent width (8m) of the 8785m new access roads (total area of 7.0ha) as well as widening of existing access roads from 6m to 8m (1.26ha) but excludes the temporary widening of the new and existing access roads to 10m as this will only be required during the construction phase.

The results of the calculations showed that the amended infrastructure layout is within the Allowable Development Limits for a project that generates 120MW of energy (refer to Table 2).

Table 2: Calculated allowable development limits for amended infrastructure layout of the Zen Wind Farm

<b>Sensitivity class</b>	<b>Area that will be affected by development footprint (ha)</b>	<b>Allowable limit (ha/MW)</b>	<b>Area allowed for a 112 MW development (ha)</b>	<b>Area that exceeds allowable limit (ha)</b>
Very High	0.00	0.00	0.00	0.00
High/Medium (within crop field boundaries)	8.96	0.20	22.40	0.00

Even if the construction phase footprint is considered, i.e., the temporary widening of both new and existing access roads with 2m (to reach a width of 10m) as well as the temporary facilities of 7.2ha, the project footprint is still within the allowable development limits, the total area affected during the construction phase will be 14.51ha.

## 9. Impact assessment

### 8.1 Direct impacts

Following the consideration of all the baseline data as well as the amended infrastructure layout, the impacts identified within the original assessment report (Terra Soil Science, 2012), are still applicable. No additional impacts or change in impact significance will occur because of this amendment. No additional mitigation and management measures are required because of the proposed amendments.

### 8.2 Cumulative impacts



Since cumulative impacts were not assessed as part of the original assessment, it is included in the amendment assessment. “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 in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities<sup>1</sup>.

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 Zen Wind Farm is located within a 30km radius of two wind facilities and two PV facilities that already have been granted Environmental Authorisation and one wind facility that is operational (see **Figure 10**). It is also in close proximity to the three grid solution projects. The cumulative impacts of the proposed project in addition to the authorised solar developments are rated and discussed below.

The cumulative impacts of the proposed project in addition to the authorised solar developments are rated and discussed below.

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<sup>1</sup> Unless otherwise stated, all definitions are from the EIA Regulations 2014 (GNR 326).



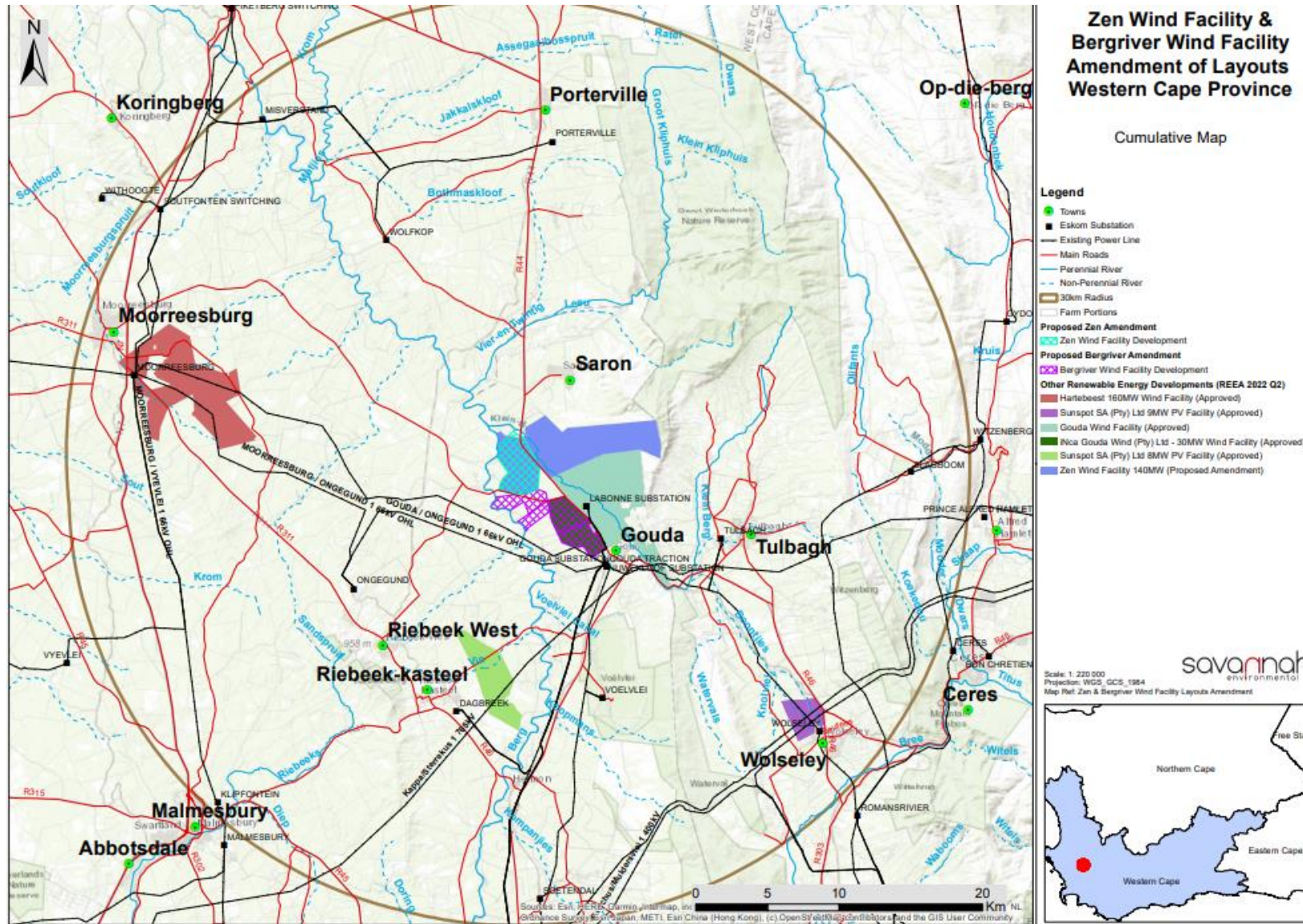


Figure 10: Renewable energy projects within a 30km radius around the Zen project site



**Table 3: Assessment of cumulative impact of decrease in areas available for rainfed wheat production**

<b>Nature:</b> Decrease in areas where rainfed wheat is produced.		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Low (4)
<b>Probability</b>	Definite (5)	Definite (5)
<b>Significance</b>	<b>Medium (35)</b>	<b>Medium (50)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Low
<b>Loss of resources?</b>	No	Yes
<b>Can impacts be mitigated?</b>	N/A	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> <ul style="list-style-type: none"> <li>The construction activities must remain within the areas as indicated in the layout provided by the developer.</li> <li>No parking of vehicles and equipment allowed in crop fields and outside of the infrastructure footprint.</li> <li>The existing roads may be widened to a maximum of 10m and the additional width affected during construction must be rehabilitated at the end of the construction phase.</li> <li>The areas around the turbine hardstands must be cleared from any construction materials once the construction of a turbine is completed and the area must be rehabilitated to allow for crop production around the hardstands.</li> <li>Any temporary laydown areas must be removed and the area rehabilitated back to crop fields.</li> <li>Construction activities must preferably take place outside of the rainy season to avoid unnecessary soil compaction of the access roads.</li> </ul>		

**Table 4: Assessment of cumulative impact of fragmentation of crop fields**

<b>Nature:</b> Increase in areas where crop fields are fragmented by wind farm infrastructure such as wind turbines and access roads.		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Minor (2)	Low (4)
<b>Probability</b>	Probable (3)	Highly likely (4)
<b>Significance</b>	<b>Low (21)</b>	<b>Medium (40)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Low
<b>Loss of resources?</b>	No	Yes
<b>Can impacts be mitigated?</b>	N/A	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> <ul style="list-style-type: none"> <li>Position wind turbines within the development area so that fields remain large enough to use existing farm equipment for cultivation and harvesting.</li> <li>Use existing farm roads where possible and only widen the roads where absolutely necessary.</li> </ul>		



**Table 5: Assessment of cumulative impact of areas susceptible to soil erosion**

<b>Nature:</b> Increase in areas susceptible to soil erosion		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Medium (30)</b>	<b>Medium (33)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint;</li> <li>• Unnecessary land clearance and earthworks must be avoided;</li> <li>• Level any remaining soil removed from the hardstand areas that remained on the surface instead of allowing small stockpiles of soil to remain on the surface;</li> <li>• Regularly monitor the site to check for areas where signs of soil erosion may start to appear;</li> <li>• Should any soil erosion be detected, it must be addressed immediately through rehabilitation and surface stabilisation techniques.</li> </ul>		

**Table 6: Assessment of cumulative impact of areas susceptible to soil compaction**

<b>Nature:</b> Increase in areas susceptible to soil erosion		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Medium-term (3)	Medium-term (3)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Improbable (2)	Probable (3)
<b>Significance</b>	<b>Low (16)</b>	<b>Low (27)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	No	No
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint;</li> <li>• Unnecessary land clearance must be avoided;</li> <li>• Where possible, conduct the construction activities outside of the rainy season; and</li> <li>• Vehicles and equipment must park in designated parking areas.</li> </ul>		

**Table 7: Assessment of cumulative impact of increased risk of soil pollution**

<b>Nature:</b> Increase in areas susceptible to soil pollution
---





	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Short-term (2)	Short-term (2)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low (27)</b>	<b>Medium (30)</b>
<b>Status (positive/negative)</b>	Negative	Negative
<b>Reversibility</b>	Low	Low
<b>Loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	No
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> <ul style="list-style-type: none"> <li>• Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills;</li> <li>• Any waste generated during construction, must be stored in designated containers and removed from the site by the construction teams; and</li> <li>• Any left-over construction materials must be removed from site.</li> </ul>		

## Acceptability statement

The amended layout of the Zen Wind Farm is considered an acceptable change of the original layout, from the perspective of the project's impact on the agriculture resources of the area. The statement follows the consideration of the amended layout of Zen Wind Farm, as well as confirmation that all baseline conditions remained the same as during the original assessment. The baseline conditions remain unchanged since the original assessment and the infrastructure footprint still affects land with High and Medium agricultural sensitivity.

The impact rating, as provided in the original assessment, remains valid and the mitigation measures provided in the initial assessment are still applicable. During this assessment, the cumulative impacts as a result of this project as well as other similar projects in the area, were rated and mitigation measures provided. Apart from the mitigation and management measures for cumulative impacts, no additional mitigation and management measures are required to be included for the management of agricultural and soil impacts in the Environmental Management Programme (EMPr).

The amended layout will have a reduced effect on the significance of impacts identified in the EIA report, as the surface footprint of the amended layout is smaller than the footprint of the original layout. It is therefore my professional opinion that the amendment requests be considered favorably.

In addition, the Specialist confirms the acceptability of the amended facility layout (for submission to and approval by DFFE), and that no additions/changes to the Environmental Management Programme (EMPr) are required



## 10. Reference list

Terra Soil Science, January, 2012. Agricultural Potential and Impacts: Zen Wind Energy Facility : Gouda, Western Cape Province



## APPENDIX 1 – SPECIALIST DECLARATION



### environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

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

File Reference Number:	(For official use only)
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

Zen Wind Farm, Western Cape, 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](mailto:EIAAdmin@environment.gov.za)




## 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 ; BSc. (Agric) Plant Production		
Professional affiliation/registration:	SACNASP (Registration no: 400274/10) ; Soil Science Society of South Africa		
Physical address:	Farm Strydpoort, 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

TERRAFRICA CONSULT CC  
Name of Company:

14 JULY 2023  
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

TERRAFERICA CONSULT CC

Name of Company

14 JULY 2023

Date



Signature of the Commissioner of Oaths

14 JULY 2023

Date



Commissioner of Oaths (RSA)  
Stephanus Francois Kasselman  
59 Kruger street Wolmaransstad 2630  
T: 018 896 1320 F: 018 596 1395

**Jacques Swart & Kie**  
BTW: 4960 2610 24  
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Ottosdal 2610  
Tel nr: 018 571 0783  
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## APPENDIX 2 - CURRICULUM VITAE OF SPECIALIST

# MARINÉ PIENAAR

## Specialist Scientist



+2782-828-3587



mpienaar@terraafrica.co.za



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 Booyendal 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 (SSSA)

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
- Itlathai 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



**NATALIA RODRIGUEZ EUGENIO**  
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**APPENDIX 2 – 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 field(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 2024**



  
\_\_\_\_\_  
Chairperson

  
\_\_\_\_\_  
Chief Executive Officer



To verify this certificate scan this code

