SCOPING PHASE REPORT

SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SURVEY:

PROPOSED OLIFANTS RIVER WIND ENERGY FACILITY IN THE WESTERN CAPE PROVINCE

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DECLARATION

I, Johan Hilgard van der Waals, declare that I –

- 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 71 and is punishable in terms of Section 24F of the Act.

J.H. VAN DER WAALS
TERRA SOIL SCIENCE

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SCOPING PHASE SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SURVEY – PROPOSED OLIFANTS RIVER WIND ENERGY FACILITY IN THE WESTERN CAPE PROVINCE

1. TERMS OF REFERENCE

Terra Soil Science (TSS) was commissioned by Savannah Environmental (Pty) Ltd to undertake a scoping level soil, land use, land capability and agricultural potential survey for the proposed Olifants River Wind Energy Facility in the Western Cape Province.

2. INTRODUCTION

A scoping level soil, land use, land capability and agricultural potential survey was conducted for the proposed Olifants River Wind Energy Facility in the Western Cape Province.

3. DESCRIPTION OF THE SURVEY AREA

3.1 Survey Area Boundary

The survey area lies between 31° 33' 00'' and 31° 38' 48'' south and 18° 09' 39'' and 18° 13' 50'' east approximately 12 km west of the town of Lutzville in the Western Cape Province (**Figure 1**).

3.2 Survey Area Physical Features

The survey area lies on undulating terrain with a distinct valley bottom wetland system and stream channel of the Olifants River running through the site. The altitude varies between 10 m and 90 m above mean sea level. The geology is dominated by alluvium, calcrete deposits and sand.

4. SOIL, LAND CAPABILITY, LAND USE SURVEY AND AGRICULTURAL POTENTIAL SURVEY

4.1 Method of Soil, Land Capability, Land Use Survey and Agricultural Potential Survey

The scoping soil, land capability, land use and agricultural potential surveys were conducted in two phases.

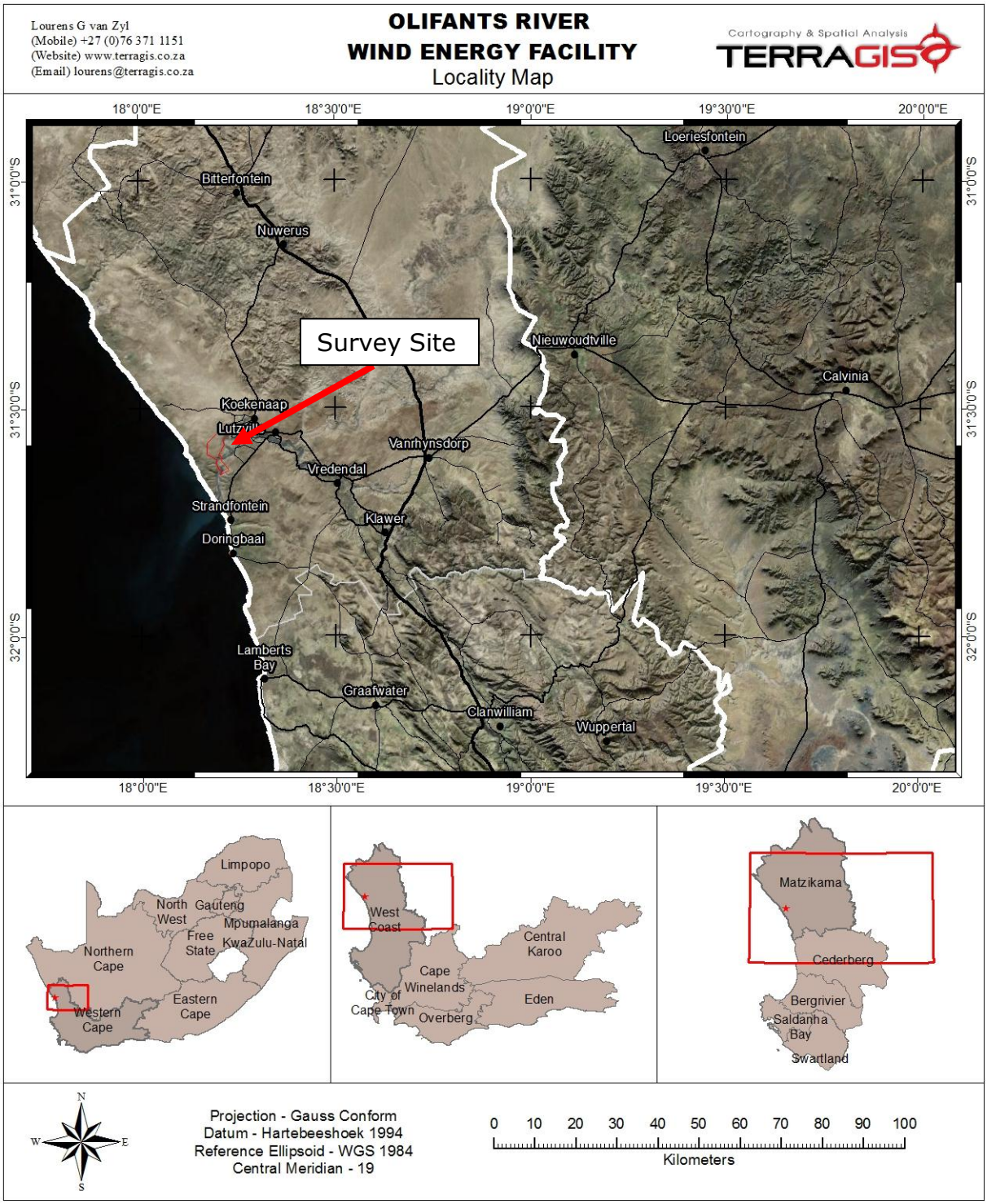

Figure 1 Locality of the survey site

4.1.1 Phase 1: Land Type Data

Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC). 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 (in the cross section). The soil data is classified according to the Binomial System (MacVicar et al.,

1977). The soil data was interpreted and re-classified according to the Taxonomic System (MacVicar, C.N. et al. 1991).

4.1.2 Phase 2: Aerial Photograph Interpretation and Land Use Mapping

The most up to date aerial photographs of the site were obtained from Google Earth. The image was used to interpret aspects such as land use and land cover as well as historic land uses such as cultivation.

4.2 Soil, Land Capability, Land Use and Agricultural Potential Survey Results

4.2.1 Phase 1: Land Type Data

The site falls into the **Ae373**, **Ae375** and **Ia193** land types (Land Type Survey Staff, 1972 - 2006). (Refer to **Figure 2** for the land type map of the area). Below follows a brief description of the land types in terms of soils, land capability, land use and agricultural potential. Due to the large degree of similarity between the firstly the Fc land types and secondly the Ib land types they will be discussed in combination.

Land Types Ae373 and Ae375

Soils: Predominantly red soils of variable depth and high base status, often with free lime and calcrete layers. Profiles vary from homogenous in colour to variable leading to the frequent identification of pedologically young soils. Not mentioned in the land type data is the ubiquitous presence of "heuweltjies" – small hills with distinct lime pans and accumulation compared to the areas between. The heuweltjies are visible on aerial photographs as round spots on the image (**Figure 3**).

Land capability and land use: Exclusively extensive grazing due to climatic and soil constraints. Soil erosion is a distinct risk due to low vegetation cover.

Agricultural potential: Very low potential due to the low rainfall (less than 200 mm per year – **Figure 4**). The soils can be developed for irrigation purposes but will require significant and expensive preparation.

Land Type Ia193

Soils: Predominantly soils associated with drainage depressions namely soils with signs of recent transportation in the form of stratified alluvium as well as pedologically young soils with distinct colour variation in the form of cutanic character. A range of other soils associated with drainage depression also occur sporadically.

Land capability and land use: Almost exclusively wetland although the areas can be used for grazing.

Agricultural potential: Medium to low but not advisable for agriculture as these areas constitute wetlands and water courses.

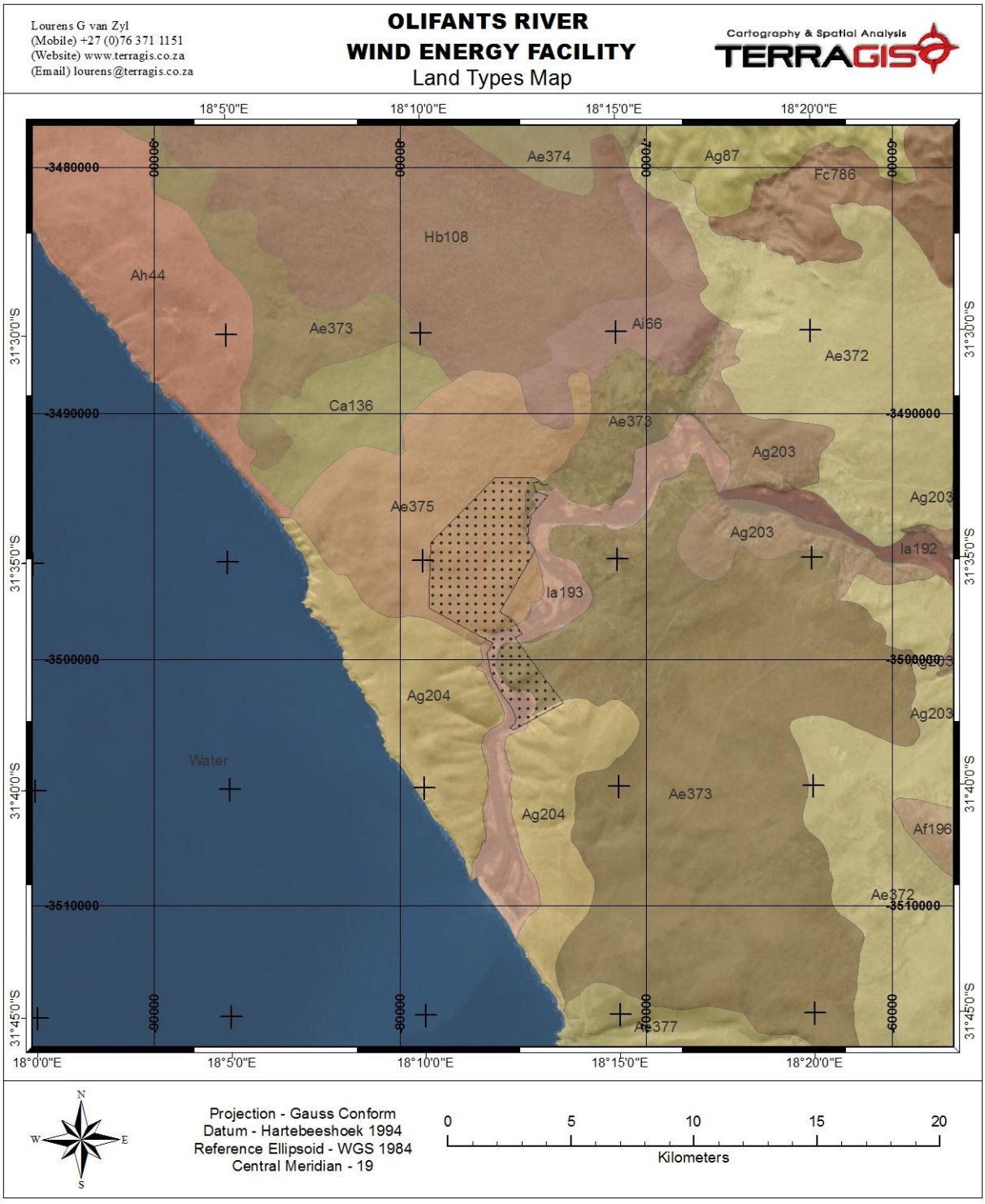

Figure 2 Land type map of the survey site

Figure 3 Heuweltjies on the site in the form of round dots in the landscape

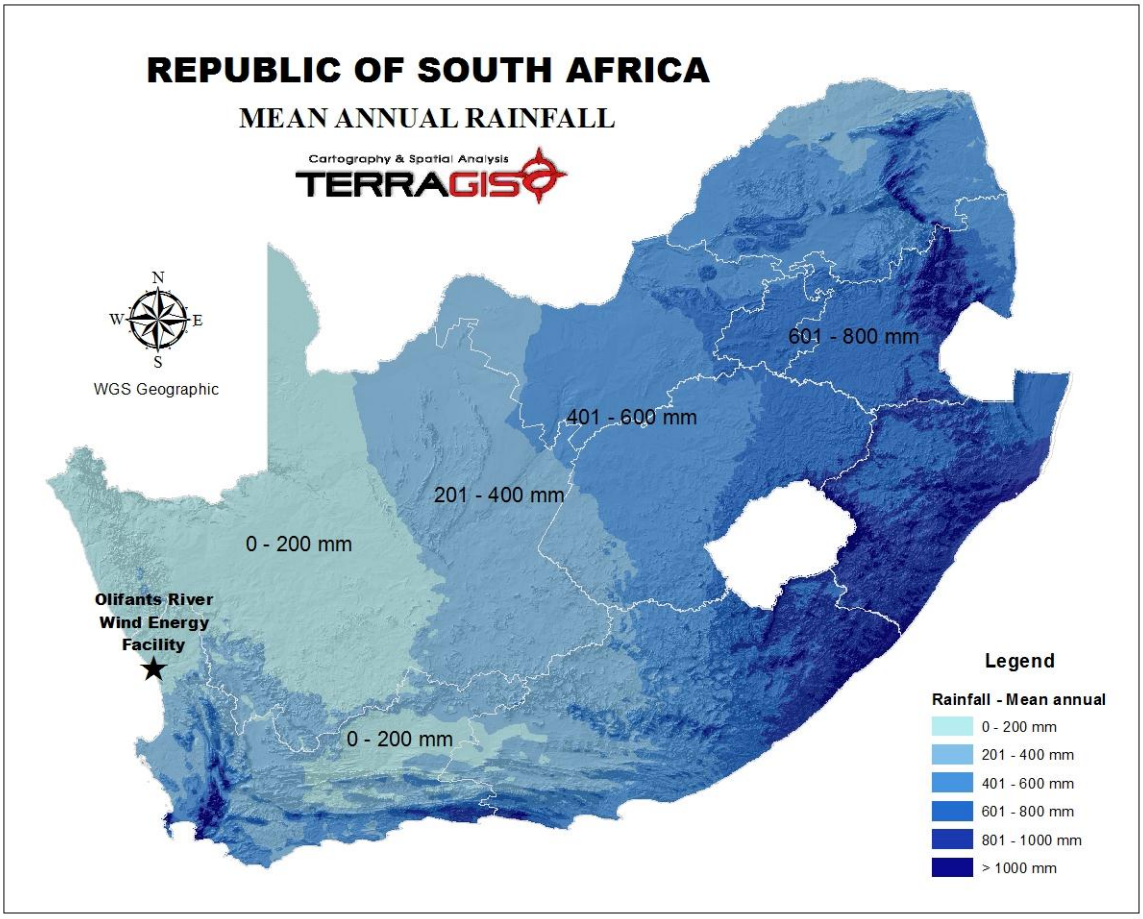

Figure 4 Rainfall map of South Africa indicating the survey site

4.2.2 Phase 2: Aerial Photograph Interpretation and Land Use/Capability Mapping

The interpretation of the Google Earth image yielded a dominant land use namely extensive grazing and a sub dominant one of irrigated agriculture (**Figure 5**). The land capability of the site can be considered to be "wilderness" as the grazing capacity is low enough that only natural land uses and low intensity grazing is practiced. In areas where water is available and where irrigation infrastructure has been established the land capability becomes arable. The drainage channel and associated areas qualify as wetland.

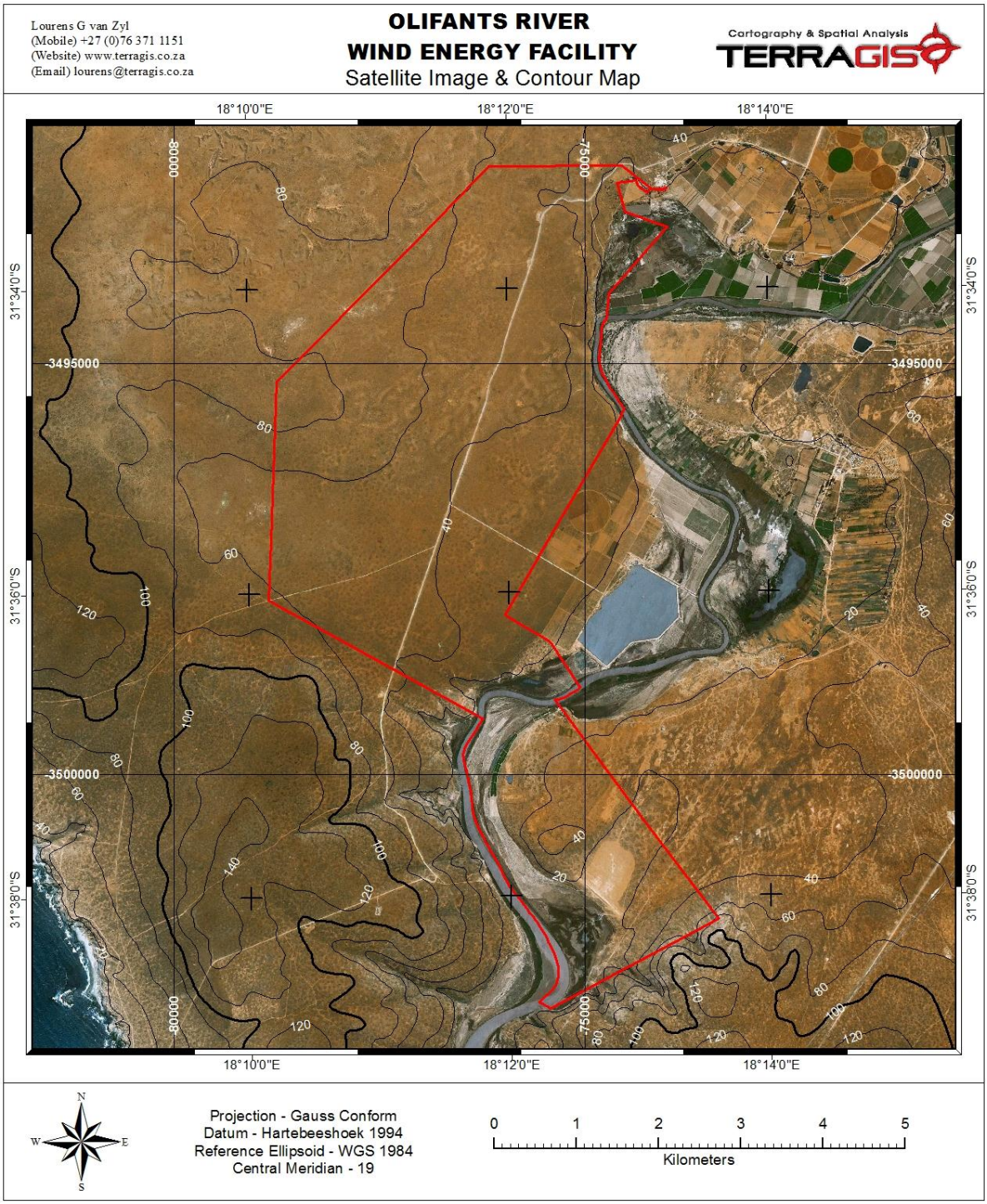

Figure 5 Land use on the survey site (extensive grazing with small areas of irrigated agriculture and wetland/water course)

5. INTERPRETATION OF SOIL, LAND CAPABILITY AND LAND USE SURVEY RESULTS

The interpretation of the land use and land capability results yielded a number of aspects that are of importance to the project.

5.1 Agricultural Potential

The agricultural potential of the site is very low and limited to extensive grazing mainly due to the low rainfall. Most of the soils are suited to irrigated agriculture on the condition that water is available and the land owners are willing to invest large sums of money in land preparation. For a comparison of land uses refer to areas further up in the Olifants River Valley.

5.2 Presence of Wetlands

Being an arid area the soils on the site will in all probability exhibit very few signs of hydromorphism. Be that as it may it is quite clear that the area associated with the Olifants River qualifies as a water course. Flat areas outside of the immediate stream channel, although probably lacking soils with distinct hydric properties, also qualify as wetland as the vegetation will indicate periodic episodes of inundation and wetness. The stream channel and wetlands should be delineated with an altered approach to the wetland delineation guidelines (DWAF, 2005) as the criteria stipulated in the guidelines do not apply suitably to arid landscapes.

5.3 Overall Soil Impacts

The impacts of the proposed wind energy facility on agriculture will be very low due to the low agricultural potential and low carrying capacity of the site. Impact on wetlands and water courses should be eliminated through the pegging of such areas as no-go zones for development of wind turbine sites. Wind turbines occupy small areas of land (in terms of footprints) and it is therefore still possible to develop irrigated lands in between the turbines.

Due to the low rainfall, impacts on the soils such as erosion and dust generation are considered more problematic and will have to be addressed in more detail in the EIA process.

6. ANTICIPATED SOIL / LAND USE / AGRICULTURE IMPACTS

The following impacts are expected for the proposed development:

6.1 Physical Soil Disturbance Due To Construction Activities

Construction activities should be kept out of wetland and water course areas.

Nature of Impact: Direct impacts are associated with the soils along the constructed roads as well as on the turbine construction sites. Indirect impacts could arise in the form of soil erosion

and degradation if storm water management is not planned and managed properly as it is generated on the roads, construction sites and turbine footprints. Cumulative impacts are only considered to be problematic if the aforementioned storm water management is not instituted. Otherwise very limited cumulative impacts are expected due to the shallow nature of the soils.

Extent of Impact: The extent of this impact will be local in terms of the activity and will be associated with the activity only. Slightly larger, but still local in extent, impacts are expected if storm water runoff is not controlled.

Potential Significance of Identified Impacts: The potential significance of the identified impacts is high as the sediment generated on site could influence other areas of natural vegetation which have a high conservation status.

Potentially Significant Impacts to be Assessed in EIA Phase: The potentially significant impacts to be assessed in the EIA phase will be limited to the classification of the soils as well as assessment of slopes. These parameters will provide an indication to the project engineers regarding the erosion risk as well as inform the mitigation measures to be implemented on the site.

6.2 Impacts on Current Land Use Due To Construction Activities

The bulk of the current land use is limited to natural uses (grazing and/or conservation?).

Nature of Impact: Direct impacts are associated with the constructed roads as well as the turbine construction sites. Indirect impacts could arise in the form of land use changes due to soil erosion and degradation if storm water management is not planned and managed properly as it is generated on the roads, construction sites and turbine footprints. Cumulative impacts are only considered to be problematic if the aforementioned storm water management is not instituted. Otherwise very limited cumulative impacts are expected due to the low intensity land uses practiced on the site. Impacts associated with irrigated agriculture should be avoided.

Extent of Impact: The extent of this impact will be local in terms of the activity and will be associated with the activity only. Slightly larger, but still local in extent, impacts are expected if storm water runoff is not controlled.

Potential Significance of Identified Impacts: The potential significance of the identified impacts is high as the sediment generated on site could influence other areas of natural vegetation which have a high conservation status.

Potentially Significant Impacts to be Assessed in EIA Phase: The potentially significant impacts to be assessed in the EIA phase will be the extent to which conservation of the natural vegetation in the areas will be impacted by the development footprint.

6.3 Impacts on Agricultural Potential Due To Construction Activities

Construction activities should be kept out of areas developed as irrigated fields or planned as such in the future.

Nature of Impact: Direct impacts are considered to be small due to the low agricultural potential. Significant indirect and/or cumulative impacts are considered to be improbable due to the low potential on the bulk of the site.

Extent of Impact: The extent of this impact will be local in terms of the activity and will be associated with the activity only. Slightly larger, but still local in extent, impacts are expected if storm water runoff is not controlled. The impacts are considered to be low due to the low agricultural baseline of the site.

Potential Significance of Identified Impacts: The potential significance of the identified impacts is high as the sediment generated on site could influence other areas of natural vegetation which have a high conservation status.

Potentially Significant Impacts to be Assessed in EIA Phase: The potentially significant impacts to be assessed in the EIA phase will be the extent to which conservation of the natural vegetation in the areas will be impacted by the development footprint.

7. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development of a wind energy facility on the site will not have large impacts on the current land use of the broader area. This is mainly due to the low agricultural potential, dominant soils and climatic constraints for the site. Long-term detrimental impacts are not expected but adequate mitigation and management measures have to be put in place. The main aspects that will have to be managed on the site include erosion and dust generation during the construction process.

A detailed site visit will have to be conducted as part of the EIA level investigation and the following parameters should be investigated:

» Soil distribution (classification) on the site;
» Wetland distribution on the site;
» Extent of degradation due to current land use (such as overgrazing);
» Erosion status and erodibility of the soils on the site; and
» Mitigation measures to arrest current impacts and manage future impacts associated with the development.

8. LIMITATIONS / GAPS IN KNOWLEDGE

The following limitations, or gaps in knowledge, exist for the proposed activity on the site

» Soil distribution (classification) on the site (to be generated during the EIA phase);
» Wetland distribution on the site (to be generated during the EIA phase);
» Extent of degradation due to current land use (to be generated during the EIA phase);
» Erosion status and erodibility of the soils on the site (to be generated during the EIA phase); and
» Design specifications and layout of proposed development. This detail will guide the specific impacts to be assessed as well as the proposed mitigation measures.

REFERENCES

DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF). 2005. A practical field procedure for identification and delineation of wetland and riparian areas. DWAF, Pretoria.

LAND TYPE SURVEY STAFF. (1972 – 2006). *Land Types of South Africa: Digital map (1:250 000 scale) and soil inventory databases*. ARC-Institute for Soil, Climate and Water, Pretoria.

MACVICAR, C.N. et al. 1977. *Soil Classification. A binomial system for South Africa.* Sci. Bull. 390. Dep. Agric. Tech. Serv., Repub. S. Afr., Pretoria.

MACVICAR, C.N. et al. 1991. *Soil Classification. A taxonomic system for South Africa. Mem. Agric. Nat. Resour. S.Afr.* No.15. Pretoria.