ENVIRONMENTAL IMPACT ASSESSMENT

PROPOSED CONSTRUCTION AND IMPLEMENTATION OF 225 MEGAWATT PHOTOVOLTAIC FACILITY ON PORTION 12 OF THE FARM 454 DYASONSKLIP NEAR UPINGTON, NORTHERN CAPE

DRAFT REPORT ON AGRICULTURAL POTENTIAL STUDY

DATE: 24 JULY 2013

STUDY CONDUCTED AND REPORT COMPILED BY: C R LUBBE

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EXECUTIVE SUMMARY

Cape Environmental Assessment Practitioners (Pty) Ltd is currently conducting an EIA for RE Capital 3 (Pty) Ltd who propose to construct a 225MW (MegaWatt) Photovoltaic (PV) facility on Portion 12 of the farm 454 Dyasonsklip, located approximately 25 km southwest of Upington in the Northern Cape.

The proposed development is for a 225MW (MegaWatt) Photovoltaic (PV) facility. It is envisioned that this will be developed in three phases of 75MW each.

The EIA is conducted for environmental authorisation under the National Environmental Management Act (Act 107 of 1998). As part of this EIA, an agricultural baseline study has been commissioned to consider the possible impacts of the project on its immediate environment.

The approach and methodology of the study was:

- To identify and describe the existing agricultural environment, mainly through a desktop study;
- To conduct a field survey to test the findings of the desktop study and to gather new information regarding agricultural conditions;
- To consider the necessity of conducting a full agricultural impact assessment in order to evaluate the severity of possible impacts, possible alternatives or mitigation measures to avoid or reduce the impacts of the project on the existing agricultural environment.

Findings and Conclusions

The site was found unsuitable for commercial cultivation due to limiting factors such as shallow soil depth and hard setting carbonate horizons below surface. The low clay percentage results in low water holding capacity and low nutrient availability. Severe climatic conditions, such as low rainfall, further limit commercial cultivation.

The proposed project area is utilized as grazing for cattle and sheep and this could continue after construction and during operation of the photovoltaic facility.

The construction and operation of a PV Power station would have low impact on the agricultural potential of the identified sites or the local region. Commercial agricultural activities could continue normally in the surrounding areas.

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1. INTRODUCTION

Cape Environmental Assessment Practitioners (Pty) Ltd is currently conducting an EIA for an EIA for RE Capital 3 (Pty) Ltd who propose to construct a 225MW (MegaWatt) Photovoltaic (PV) facility on Portion 12 of the farm 454 Dyasonsklip, located approximately 25 km southwest of Upington in the Northern Cape.

The proposed development is for a 225MW (MegaWatt) Photovoltaic (PV) facility. It is envisioned that this will be developed in three phases of 75MW each.

As a requirement for environmental authorisation under the National Environmental Management Act (Act 107 of 1998), an Environmental Impact Assessment (EIA) is being undertaken for the Project. As part of this EIA, an agricultural baseline study has been commissioned to assess the impacts of the project on its immediate environment.

This document reports on the results of the baseline agricultural study.

2. OBJECTIVES

The objectives of the study were:

- To evaluate the possibility of impacts on agricultural production that may result from the development of the PV power station.
- To consider the necessity of conducting a full agricultural study. The scope and purpose of the study are described in paragraph 3.

3. APPROACH AND METHODOLOGY

3.1. Desktop Study

A desktop study was conducted to review existing data and literature sources. The desktop review provided a baseline agricultural and land use profile, focusing on the specific geographical area potentially impacted by the proposed project.

3.2. Field Investigation

The site was visited and a field survey was carried out.

Potential impacts of the proposed project on agriculture were identified with particular attention to the following issues:

- The possibility of permanent loss of high potential agricultural land;
- Impairment of land capability due to construction;
- Analysis of erosion risk because of altered drainage patterns and poor rehabilitation in erosion-sensitive areas.
- Veld conditions for grazing.

4. ASSUMPTIONS AND UNCERTAINTIES

A study of this nature will inherently contain various assumptions and limitations.

As far as **regional** information is concerned, this is primarily a desktop-based study. Climatic conditions, land uses, land type and terrain are readily available from literature, GIS information and satellite imagery.

Notwithstanding these limitations, the **site-specific** field studies confirmed most of the desktop findings and I am confident that the findings provide sufficient detail for the agricultural potential study reported in this document.

5. DESCRIPTION OF THE PROPOSED PROJECT

It is proposed to construct a 225MW (MegaWatt) Photovoltaic (PV) facility in three phases of 75MW each, which will be connected to Eskom's national grid.

Two alternative project locations (study sites) have been identified, namely the "Northern Site" and the "Central Site". This study investigated both sites.

6. THE POTENTIALLY AFFECTED ENVIRONMENT

This section provides a general description of the immediate environment potentially affected by the construction and operation of the proposed PV power facility.

6.1. Locality

The proposed PV Power Station will be located on the farm Dyasonsklip 454, situated approximately 25 km Southwest of Upington (see ***Figure 1***).

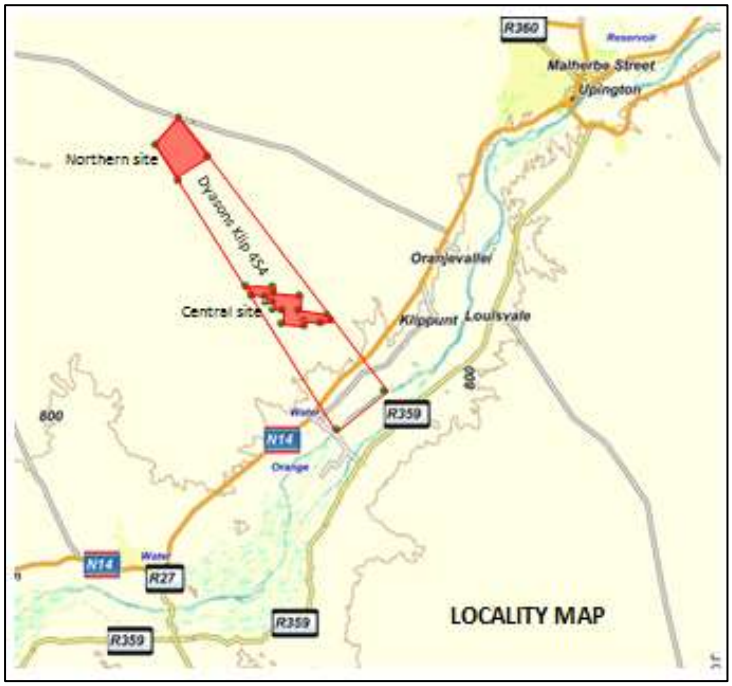

Figure 1: Location of the proposed PV Power Facility

6.2. Physical description of Site

The area surrounding the site has a differentiated agricultural character. The N14 from Keimoes towards Upington divides the agricultural practices abruptly into two practices: East from the N14 towards the Orange floodplain intensive irrigated farming is practised while extensive live stock farming takes place on the western side of the road. The reason for this abrupt difference is the availability of water for irrigation and alluvial deposits on the floodplain of Gariep River and its catchment area on the east side of the road and the arid character of the region west of the road.

6.2.1. Geology

The area lies in the Kalahari geological group, in the Namaqualand metamorphic complex. This is the youngest of the geological groups formed in the past 65 million years)

The lithology (mineralogical composition and texture of rocks) of this area consists of:

- **Sand**

During a very dry period in Southern Africa some 100 000 years ago sand was transported from the Namib dessert by strong and continuous wind and distributed over the Kalahari

- **Limestone**

Limestone is a sedimentary rock consisting largely of calcium carbonate, which is usually derived from the shells of minute marine or fresh-water animals. Sand, clay and minerals such as magnesia or iron oxide are also present.

Sedimentary and Volcanic rocks (parent material of soils) found in the area include Schist, Gneiss, Kinzigite and granite.

6.2.2. Climate

The region is classified as an arid zone with desert climate. The following specific parameters are applicable:

Rainfall	
Annual rainfall	0-200mm
Summer rainfall	<62.5mm
Winter rainfall	<62.5mm
Variation in rainfall	40 to 50%
Temperature	
Mean maximum temperature	>35ºC
January Temperature	>27.5ºC
Mean minimum temperature	2.1 to -4ºC
July temperature	<7.5ºC
Temperature range	>15ºC
First frost expected	21 to 31 May
Last frost expected	21 to 30 September
Hours of sunshine	>80%
Evaporation	>2400mm
Humidity	<30%

6.2.3. Soils

With the climate and geology associated with the area, calcic soils are prone to develop.

Calcic soils originate in arid climates with the accumulation of secondary lime, forming a distinctive horizon consisting chiefly of calcite. In calcic soils, either hardpan carbonate or a soft carbonate horizon or (rarely) gypsic horizon dominates the morphology of the sub-soil.

Soil forms with these characteristics include Molopo, Askham, Kimberly, Plooysburg, Etosha, Gamoep, Addo, Prieska, Brandvlei and Coega

AGIS indicates the typical profile for soils in this region as follows:

Area specific

- Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils.
- Lime generally present in part or most of the landscape.
- Red and yellow well drained sandy soil with high base status
- Freely drained, structure less soils
- Favourable physical properties
- May have restricted soil depth, excessive drainage, high erodability, low natural fertility

Site specific

The ***Northern Site*** soil pattern is indicated as AR2, a red and yellow well-drained sandy soil with high base status. The larger part of the area (90%) is classified as floodplain (Landform 4). Majority soils expected (>80%) to be found here are:

Old Notification		**Recent Notification**	
FORM	SERIES	FORM	FAMILY
Mispah	Loskop	Coega	Marydale
Hutton	Mangano	Plooysburg	Brakkies

Soil Form	**E.D.**	**Clay A**	**Clay B**	**Limiting**
Ms	100-200mm	6-10%		Carbonate
Hu	450-1000mm	6-10%	6-10%	Carbonate

The ***Central Site*** soil pattern is indicated as LP2. These soils has minimal development, are usually shallow, on hard or weathering rock with or without intermittent diverse soils. Lime generally present in part or most of the landscape.

The relief is different to that of the Northern Site and consist of a 22% mid slope (Landform 3), 50% Flood plain (Landform 4) and 20% Valley bottom (Landform 5)

Majority soils expected (>80%) to be found here are:

Old Notification		**Recent Notification**	
FORM	SERIES	FORM	FAMILY
Mispah	Loskop	Coega	Marydale
Hutton	Mangano	Plooysburg	Brakkies

Soil Form	E.D.	Clay A	Clay B	Limiting
Ms	100-200mm	6-10%		Carbonate
Hu	200 - 450mm	6-10%	6-10%	Carbonate

6.2.4. Vegetation

The region is marked by Karoo and Karroid veld types, while the vegetation biome is that of Nama Karoo. Sweet grass and shrub veld occur, while tree density is less than 5%.

Grazing capacity is low at 31 to 40 hectares per large stock unit (LSU).

The Normalised Difference Vegetation Index (NDVI) is low. NDVI refers to a mathematical formula applied to satellite imagery to provide information on plant activity or vigour. It is an indicator of active vegetation cover.

6.2.5. Topography

The topography has low relief with terrain form 4, namely floodplain. The slope gradient is between 0 and 2% with a concave shape.

Higher ground drains towards multiple depressions, forming waterways towards the Gariep River. *Figure 2* and *Figure 3* show the drainage patterns of the two alternative sites.

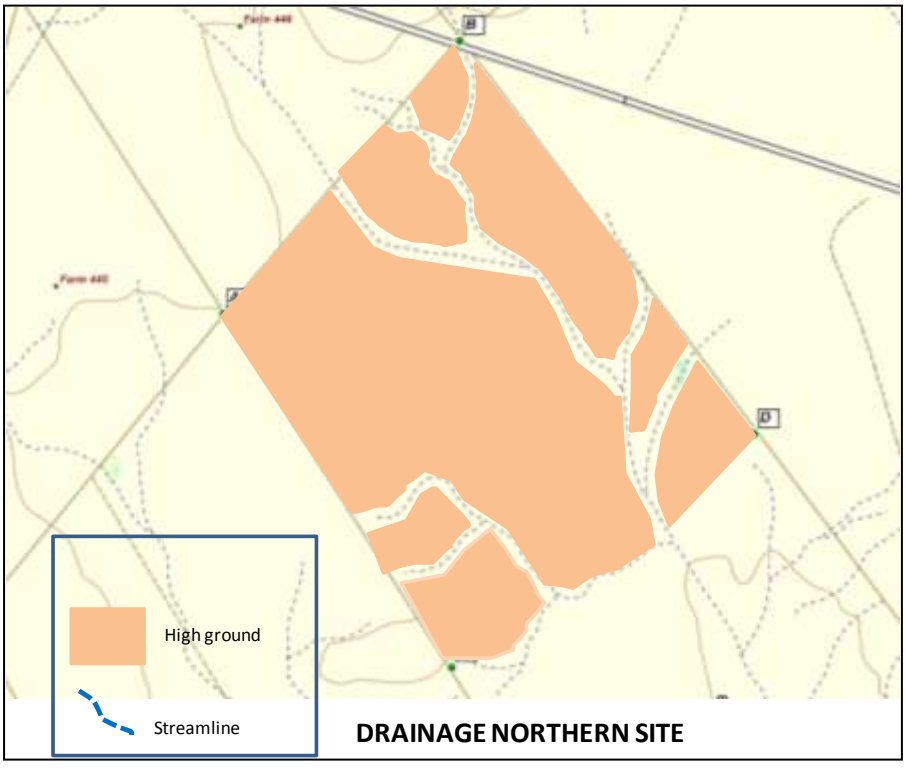

Figure 2: Drainage on the Northern Site

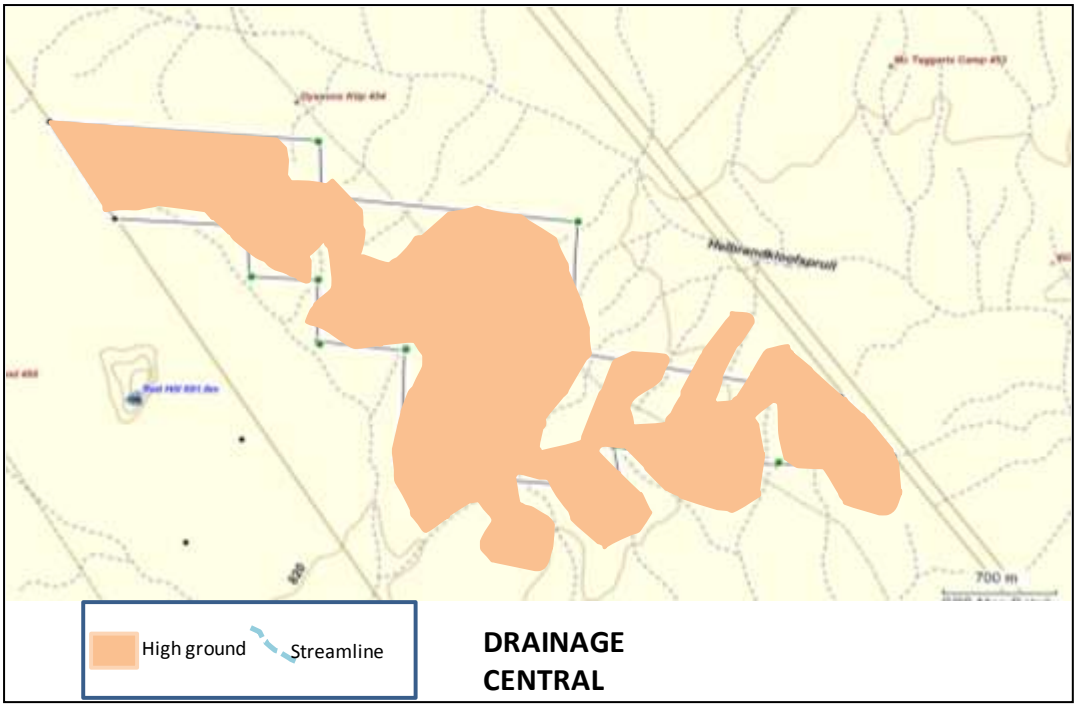

Figure 3: Drainage of the Central Site

6.3. Past and Current Agricultural Activities on Site

The sites are currently utilised for extensive cattle and sheep farming. There is no evidence of past or current cultivation.

6.4. Structures on site

Current structures on site include:

- Handling facilities (collecting kraals with removable handling facilities
- Boundary fences consist of 1200mm Jackal Proof fence wire. The northern fence is electrified.
- Internal stock camp fencing of 900mm.
- Windmill
- Reservoir
- Drinking troughs where camps intersect
- One overhead Eskom transmission line through the Northern Site and one between the N14 and the Central Site

The location of these structures are illustrated in *Figure 4* and
Figure 5

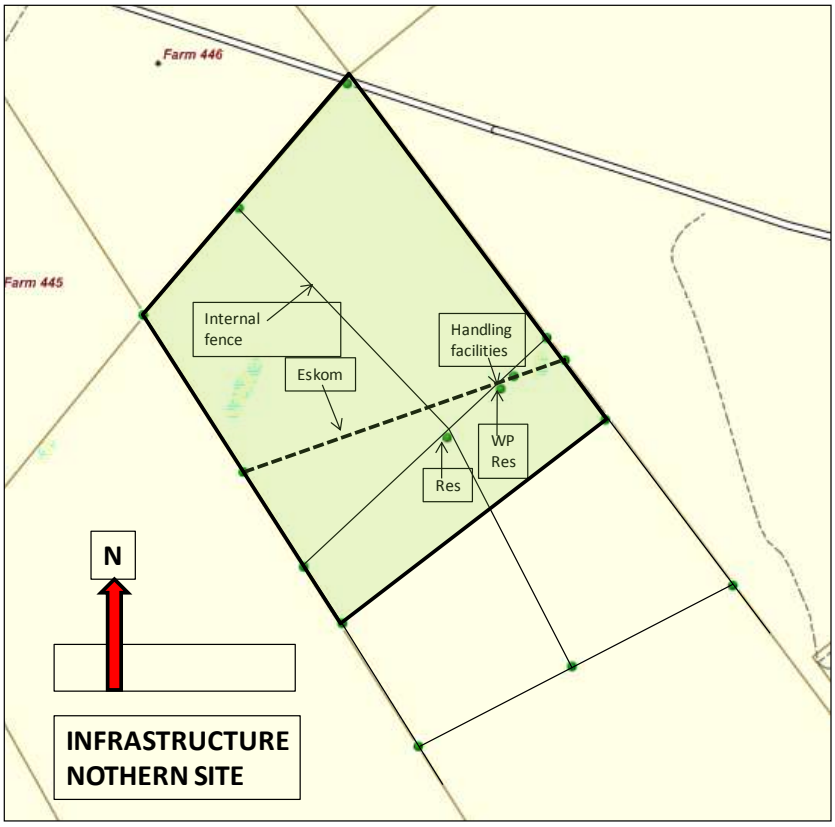

Figure 4: Infrastructure on Northern site

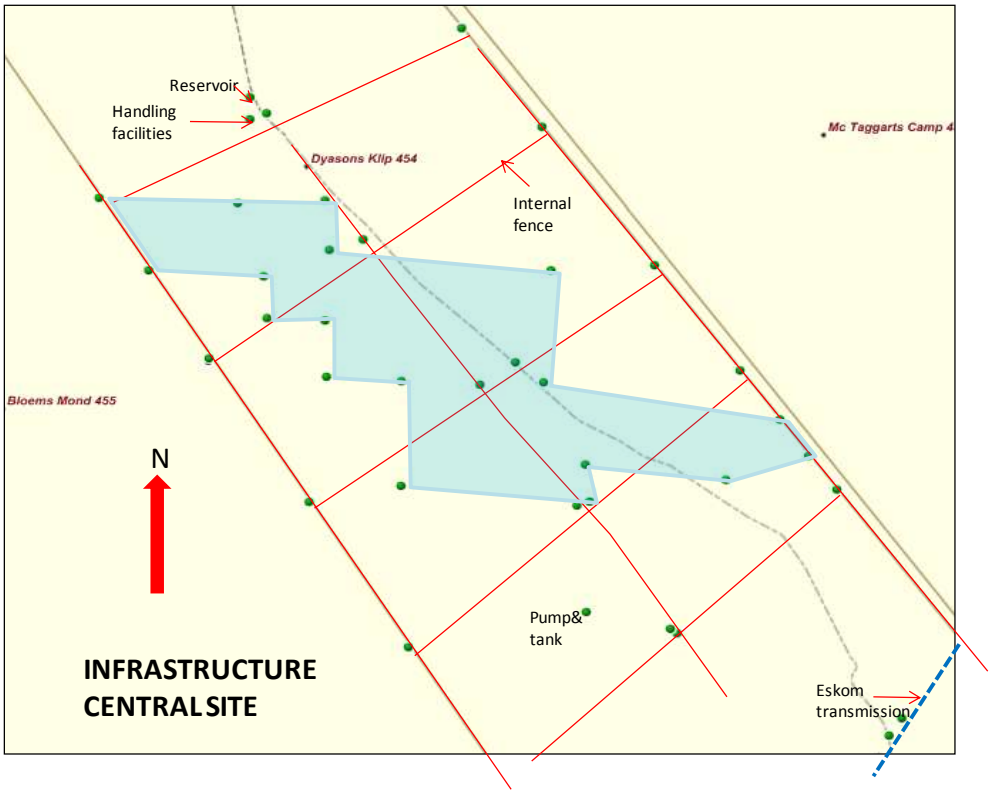

Figure 5: Infrastructure on Central Site

6.5. Surrounding developments

To the south and west of the sites, stock farming takes place, while intensive irrigation and vineyards occur to the east. North of the site, a power station is being constructed by Eskom.

7. STUDY FINDINGS

7.1. Soil survey

The site was visited on 8 and 9 July 2013.

Soil was augered at a 200m interval on sections of the two sites as indicated in Figures 6 to 8 and soil properties were noted from samples taken with a hand auger. Table 1 shows the method and various soil properties noted. Hereafter augering points were plotted and soil groups were indicated.

Table 1: Soil properties noted

Depth	Stone	Colour
Texture	Sand grade	Terrain
Structure	Geology	Shape
Consistency	Wetness	Land cover
Carbon	Moisture	Erosion
Limiting		

The augering points in **Error! Reference source not found.** are representative of the three soil forms identified on the ***Northern Site***.

Table 2: Soil Forms identified at the Northern Site

Plooysburg (40-60 cm)
About 13% of the area is represented by the Plooysburg form (Family Brakkies), indicated by a red line in Figures 6 and 7. Details are as follows.
10-20cm red sandy (Very fine grade) single grain structured top soil
20-40cm Red brown, loamy sand, (Very fine grade) structure less sub soil
40-60cm Hardpan Carbonate horizon
Brandvlei (20-30 cm)
About 13% of the area is represented by Brandvlei (Family Grootvloer), indicated by a green line in Figures 6 and 7. Details are as follows
10-20cm red sandy (fine grade) with single grain structured top soil
40-60cm Soft Carbonate horizon

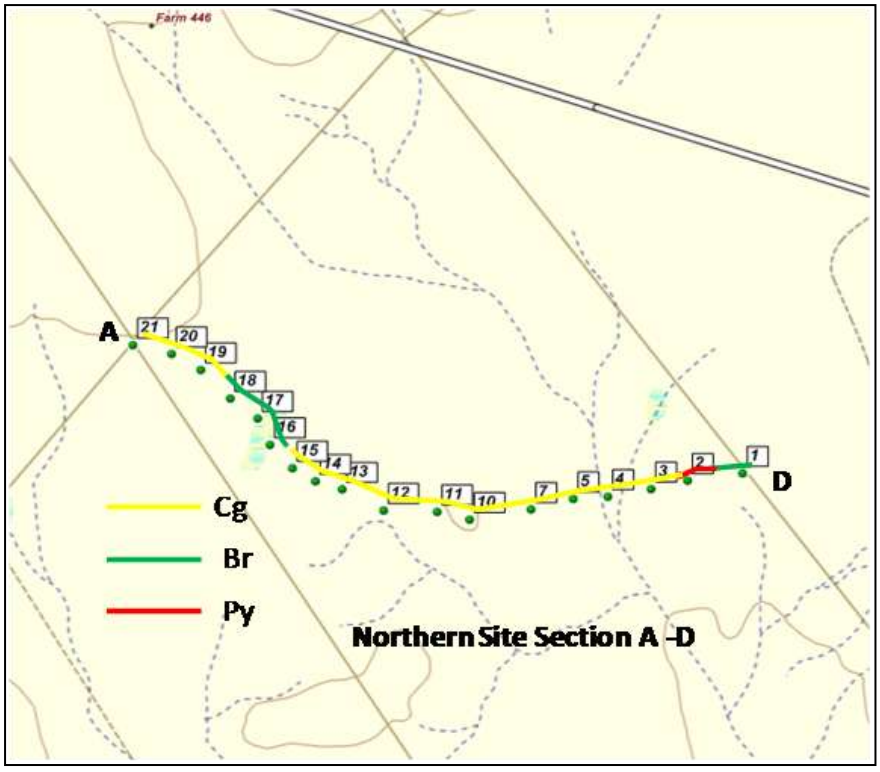

Figure 6: Augering points A-D at the proposed Northern Site

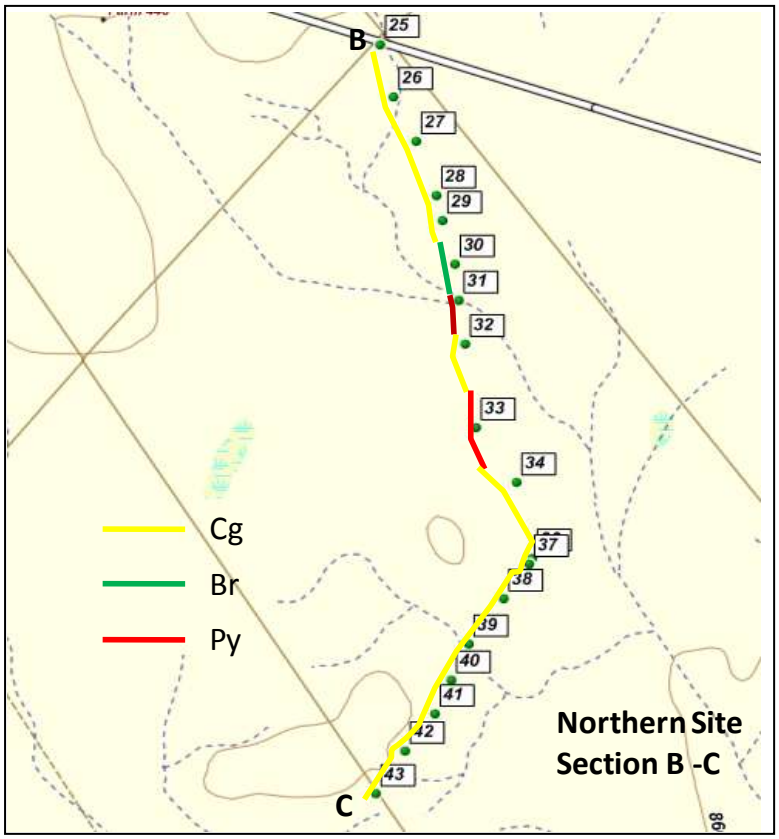

Figure 7: Augering points B-C at the proposed Northern Site

Coega (20-30 cm)	
The largest part of the site (74%) consists of the Coega soil form (Family Marydale). These areas are marked by a yellow line on Figures 6 and 7.	
0 - 20cm red, sandy, (fine grade)with single grain structure top soil	
40 – 60cm Hard pan Carbonate horizon	
	
Plooysburg	**Coega**

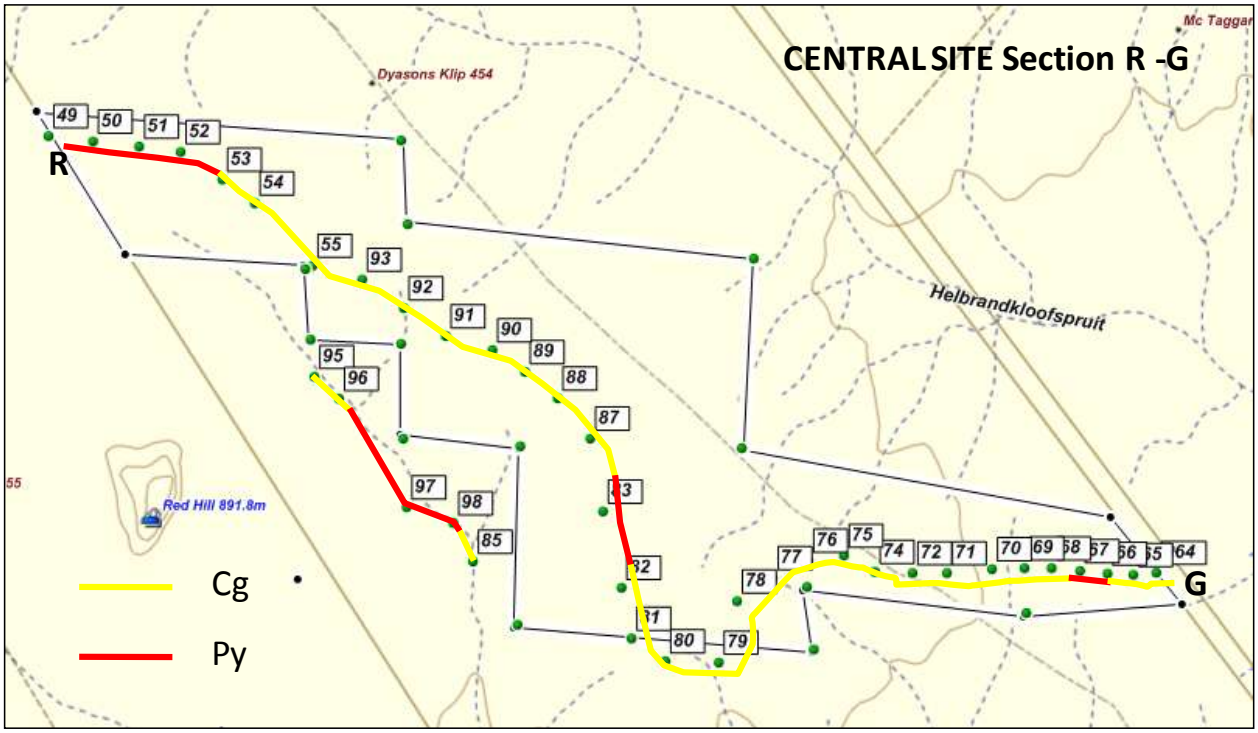

Figure 8: Augering points R-G at the proposed Central Site

Table 3: Soil Forms identified at the Central Site

Plooysburg (40-60 cm)	
About 23% of the area is represented by the Plooysburg form (Family Brakkies), indicated by a red line in Figure 8. Details are as follows.	
10-20cm red sandy (Very fine grade) single grain structured top soil	
20-40cm Red brown, loamy sand, (Very fine grade) structure less sub soil	
40-60cm Hardpan Carbonate horizon	
Coega (20-30 cm)	
The largest part of the site (77%) consists of the Coega soil form (Family Marydale). These areas are marked by a yellow line on Figure 8.	
0 - 20cm red, sandy, (fine grade)with single grain structure top soil	
40 – 60cm Hard pan Carbonate horizon	
	
Plooysburg	**Coega**

7.2. Veld Condition Assessment

A veld condition assessment was done simultaneous with the soil survey, by visual acknowledgement and random sampling on a 1m³ grids. The assessment method is illustrated in Table 4.

Table 4: Veld assessment method

	How is the plant cover?	Score
	What types of grasses most common?	Score
	How is the soil condition?	Score
	How much bush encroachment is present?	Score
	What is the soil type?	Score

The outcome of the veld condition assessments is shown in Table 5 and Table 6. The veld condition is also demonstrated by the photos in *Figure 9* and *Figure 10*.

Table 5: Veld Condition Assessment outcome: Northern Site

ASSESSMENT CATEGORY	FINDING	SCORE
PLANT COVER	Plant cover very sparse with large bare areas	3
COMMON GRASSES	Moderate and poor grazing mixed Stipagrostis Ciliata Fingerhuthia Africana Karoo shrubs	6
SURFACE CONDITION	Moderate levels of top soil loss	3
BUSH ENCROACHMENT	Medium to light encroachment present	6
SOIL TYPE	Sandy soil	2
	TOTAL	20

Figure 9: Veld conditions: Northern Site

With a score of 20/80 and rainfall of only 200 mm per annum, the veld condition is classified as very poor with a grazing capacity of 110 ha/LSU.

Table 6: Veld Condition Assessment outcome: Central Site

ASSESSMENT CATEGORY	FINDING	SCORE
PLANT COVER	Plant cover very sparse with large bare areas	10
COMMON GRASSES	Moderate and poor grazing mixed Stipagrostis Ciliata Fingerhuthia Africana Karoo shrubs	10
SURFACE CONDITION	Moderate levels of top soil loss	3
BUSH ENCROACHMENT	Medium to light encroachment present	6
SOIL TYPE	Sandy soil	2
	TOTAL	31

Figure 10: Veld conditions: Central Site

With a score of 31, the veld condition is regarded as poor with a grazing capacity of 63 ha/LSU.

It should be noted that the evaluation of veld conditions is always subjective and another valuator may find the conditions better or poorer. However, should the veld conditions be improved, the grazing capacity could only increase to 25 ha/LSU due to low rainfall, poor soil and changeable climatic conditions. Furthermore, improvement of these veld conditions could only be done by expensive effective management over decades,

7.3. Water Availability/Provision

Water is provided to livestock from boreholes pumped by windmills and stored in reservoirs and troughs.

Rainwater is also harvested in earth dams where stock can drink in season. The low rainfall and high evaporation impede the success of this operation.

7.4. Land Capability and Suitability for agriculture

Land capability is classified as non-arable low potential grazing land .This is due to the arid climate and limiting soil properties.

The land capability and suitability of **crop production** is shown in **Table 7** and **Table 8**, while capability an suitability for **grazing** is set out in **Table 9** and **Table 10**

Table 7: Land Capability and Suitability for Crop Production – Northern Site

Land capability class	Suitability Rating	Major Limitation to Crop Production	Distance Km	% of Local Study Area
Class VI Cg and Br	Very low	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	6.8	90
Class lV Py	Low	Low water holding capacity Severe climate	0.8	10

Table 8: Land Capability and Suitability for Crop Production – Central Site

Land capability class	Suitability Rating	Major Limitation to Crop Production	Distance Km	% of Local Study Area
Class VI Cg	Very low	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	5.3	77
Class lV Py	Low	Low water holding capacity Severe climate	1.6	23

Table 9: Land Capability and Suitability Assessment for Grazing - Northern Site

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle /Sheep	Low	Very shallow rooting depth on carbonate hard setting, low clay content, low rain fall, with carrying capacity of 21-25ha/LSU	590 ha	100

Table 10: Land Capability and Suitability Assessment for Grazing - Central Site

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle /Sheep	Low	Very shallow rooting depth on carbonate hard setting, low clay content, low rain fall, with carrying capacity of 21-25ha/LSU	450	100

7.5. Summary of findings

The site is largely unsuitable for cultivation due to the following limiting factors:

- Low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation.
- The very shallow soil depth with its limited water holding capacity restricts root development
- The very fine sand grade of top soil influences the stability and increases erodability potential.
- Low clay percentage results in low water holding capacity and low nutrient availability, resulting in low soil fertility.
- The establishment of a PV power station would have no severe impact on the agricultural potential or activities at the identified site, while agricultural activities would continue in the surrounding area. The following possible impacts were considered.

The area could be utilised as grazing, but it should be noted that the grazing potential is very low.

In comparison, the two alternative sites are identical as far as agricultural potential and impact is concerned. The topography of the Central Site is more favourable for the construction of the PV power facility than the Northern Site, since it is less undulating.

From the management viewpoint of the farmer, however, the Northern Site is preferable because the farm will not be divided in separate management units. Furthermore, an access road through the farm will not be necessary, since the Northern Site can be reached from the North.

It is therefore recommended that the development be done on the Northern Site.

8. POSSIBLE IMPACTS

Due to the low agricultural potential of both alternative sites, possible impacts on agricultural activities during construction and operation of the PV power facility are few.

Due to the low carrying capacity, the loss of grazing during construction is negligible. After construction and due to the nature of the power plants, animals will still be allowed to graze the site.

Should animals be on site during construction, care should be taken that they do not move into the construction area. During operation, the nature of the power plants does not give rise to concern for injury.

9. CONCLUSION

The findings of this study indicate that impacts on agriculture, locally and on site, will be minimal and will have very little influence on commercial farming. Due to poor soil properties and extreme climatic conditions, farming activities consist of grazing for sheep, but due to the low grazing potential of the region, the loss of the small area of grazing land is negligible. A full impact assessment will probably not indicate otherwise and is therefore regarded as unnecessary.

Christo Lubbe

C R LUBBE 24 July 2013
AGRICULTURAL SPECIALIST

LIMITATIONS

This Document has been provided subject to the following limitations:

(i) This Document has been prepared for the particular purpose outlined in the proposal and no responsibility is accepted for the use of this Document in other contexts or for any other purpose.

(ii) CR Lubbe did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document.

(iii) Conditions may exist which were undetectable given the limited nature of the enquiry CR Lubbe was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

(iv) It is recognised that the passage of time affects the information and assessment provided in this Document. CR Lubbe's opinions are based upon information that existed at the time of the production of the Document. CR Lubbe's opinion rests on the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site.

(v) Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

(vi) Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted for incomplete or inaccurate data supplied by others.

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Appendix B

Environmental Practitioner Curriculum Vitae

Christiaan Rudolf Lubbe

KEY QUALIFICATIONS:

National Higher Diploma in Agriculture (Irrigation), Technikon Pretoria, 1982
Certificate in Stereoscopic Interpretation, Geology and Resource Classification and Utilisation, Department of Agriculture, 1979
National Diploma in Agriculture, Technikon Pretoria, 1976

OTHER EDUCATION:

Certificate in Turf Grass Management, Technikon Pretoria, 1987
Certificate in Landscape Management, Technikon Pretoria, 1988
Cultivated pastures (Mod 320), University of Pretoria, 1995
FSC Auditors Course (Woodmark, UK), Sappi Ltd, 2003
NOSA Health and Safety Certificate, 1996
Certificate of Competence: Civil Designer - Design Centre and Survey and Design (Knowledge Base, August 2005)

EMPLOYMENT RECORD:

July 2006 to date — **CR LUBBE**
Self employed
Involved in various projects (see project related experience).

June 2004-June 2006 — **Gauteng Department of Agriculture Conservation and Environment**
(Component: Technology Development and Support) **Johannesburg, SA**
Acting Assistant Director: Resource Planning and Utilization

- Plan the utilization of agricultural resources in the Province for sustainable agricultural production and economic development
- Provide advanced scientific and practical information, advice and training (formal and informal) pertaining to land use planning to stakeholders, in order to maximise their ability to utilise their farm land effectively.
- Irrigation design and technical support
- Scoping reports for development and exemption for EIA application
- Land Reform for Agricultural Development land capability surveys
- Member technical working group for the zonation of high potential land in Gauteng

Jan 1997 – May 2004 — **CR LUBBE** **Pretoria, SA**
Self employed
Involved in various projects:

- Environmental, soil and terrain surveys in accordance with the Taxonomic Soil classification system for South Africa, the National Terrain Classification System for Forestry and Soil Groups for South African Soils. This information is captured in specified format showing attributes and recommendations and then forwarded to a GIS company for mapping and processing.
- GPS surveys
- Due diligence audit
- Fieldwork for satellite imagery
- Yield estimation

(See Project Related Experience below for detail).

1980 to 1996 — **Technikon Pretoria** **Pretoria, SA**
Lecturer
Teaching the following Agricultural Engineering and Land Use Planning subjects:

1. Soil Conservation Techniques
2. Land Use Planning
3. Drainage
4. Resource Utilisation
5. Agricultural Calculations
6. Natural Pastures
7. Mechanisation

Teaching included practical courses, examination and moderation

1974 - 1979 — **Department of Agriculture (Transvaal Region)** **Carolina and Ermelo, SA**
Senior Extension Technician
Farm Planning, Surveying, Design of soil conservation systems, Agricultural Extension.

SUMMARY OF EXPERIENCE

Has 39 years of experience in planning and managing natural resources to ensure optimal utilisation, without exploiting such resources to the detriment of future generations.

Fourteen years experience as a soil consultant, doing mainly soil surveys, terrain classification and agricultural potential studies. Reports include a variety of maps and GIS aspects thus play a large role in these surveys and studies.

Seventeen years of lecturing agricultural engineering subjects: Soil Conservation Techniques I, II and III, which dealt with the surveying, design and drawing of soil conservation structures; Farm Planning, which dealt with optimal resource utilization and Agricultural Mechanization, which dealt with the implements and machinery used to mechanize farming.

Ten years experience in the survey, design and supervising the construction of soil conservation structures in the agricultural field, mainly for farm planning.

PROJECT RELATED EXPERIENCE

PROJECTS UNDERTAKEN IN INDIVIDUAL CAPACITY

Van Zyl Environmental Consultants **Mar 2012**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station in the Northern Cape.

Bushveld Eco Services **Nov 2011**
Design and cost estimate of a stock watering system in the Lephalale disctrict.

WSM Leshika **Sep 2011**
Soil suitability survey for two new upcoming farmers at Vhuawela & Tshoga in the Limpopo Province.

National Department of Agriculture **Aug 2011**
Soil survey investigating soil potential for change of land use at the Levendal Development in the Paarl district, Western Cape.

Van Zyl Environmental Consultants **Mar 2011**
Agricultural Impact Assessment : EIA for the Construction and Operation of four Photovoltaic Power Stations in the Northern Cape.

WSM Leshika **Nov 2010**
Potential assessments and land use plans for four new upcoming farmers in the Limpopo Province.

FP Botha **Apr 2010**
Potential assessments and land use plans for various new Limpopo agricultural development hubs

Golder Associates Africa (Pty) Ltd **May 2009 – Apr 2010**
Potential assessments and Landuse plans for the resettlement of land tenants at Mafube Coal Mine in the Belfast district of the Mpumalanga Province

Sappi **Vryheid, RSA**
Undertook reconnaissance soil surveys on various plantations and farms in the Vryheid and Piet Retief districts to establish forestation potential and evaluation for species choice (covering a total area of 5173 ha).

Environmentek, CSIR **Nelspruit, RSA**
Undertook soil and terrain classification surveys on the Jessievale (8313 ha) and New Agatha (1 700 ha) plantations.

Safcol (Komatieland) **Limpopo Province**
Undertook environmental, soil and terrain classification surveys on the Thatevondo (4 500 ha), Mafela (920 ha) and Mmamatola (1 263 ha) plantations.

Measured Farming **Gabon, Swaziland & RSA**
Undertook soil and terrain classification surveys on Ranch Lope and Ranch Suba in Gabon, Kubuta Farm in Swaziland and on the farms Madikwe in the Limpopo Province and Stoffelsrus in the Free State, South Africa.

Loxton Venn and Associates **Potgietersrus, RSA**
Assess comparative soils and area for relocating Village Ga-Sekhaolelo on Overysel 815LR to Rooibokfontein 812LR and Village Ga-Puka on Swartfontein 818 LR to Armoed on Potgietersrus Platinum Mine.

Department of Water Affairs and Forestry **Gauteng**
GPS survey and alien identification for mapping of Jukskei and Swartspruit areas, as part of the Working for Water Program.

Sustainable Forestry Management Ltd **Limpopo and Mpumalanga**
Participated in a due diligence audit on various SAFCOL plantations in the Limpopo and Mpumalanga Provinces as part of the preparation of a British company's tender to purchase these plantations.

Mustek Engineering Ghana
Survey to provide a detailed inventory of the forest resources in 17 specified Forest Reserves in Ghana to develop a practical and operationally sound methodology for monitoring the natural forest resources in Ghana, based on satellite imagery for the Ghana Forestry Commission.

Gauteng Department of Agriculture, Conservation and Environment Gauteng

1. Land capability classification for household and food security projects with crop suitability recommendations and irrigation design (48 projects varying from < 1ha – 10ha in size)
2. Land use planning for farmer settlement. Land capability classification, planning of arable and non-arable land. (32 projects varying from 5 – 50 ha in size)
3. Land use planning for Gauteng municipalities for the specific purpose of farmer settlements (5 projects).
4. Land Reform Agricultural Development (LRAD): Land capability surveys for the National Department of Agriculture for farmer settlement (8 projects)
5. Stock watering system survey and design (2 projects).
6. Scoping for exemption applications from EIA to change land-use (± 550 projects)

Pretoria Technikon experimental farm Pretoria, Gauteng
Topographical survey for the design of the irrigation system, assisted with the design and installation. Managed system during the first year after installation. Installation of irrigation systems in Greenhouses on campus.

Medunsa Pretoria, Gauteng
Design of irrigation system for cultivated pastures

Tours Coffee plantation Giyani, Limpopo
Evaluation of existing system and recommendations

Langeberg Co-operation Hoedspruit, Limpopo
Evaluation of flood irrigation systems

Tambotie Farm Hammanskraal, Gauteng
Design and installation of irrigation systems for pastures and gardens.

Pretoria & Johannesburg
Design and installation of various irrigation systems for home gardens and business stands, including two nurseries.

PROJECTS UNDERTAKEN IN ASSOCIATION WITH OTHER COMPANIES

Afrigis Environmental Solutions, Pretoria

Project description	**Own Contribution**
Limpopo: Land capability study, whole province	Ground truthing desktop study
Limpopo: Agricultural Hub identification, whole province	Soil survey & land use plan
Limpopo: Nandoni Agricultural Hub	Soil survey & land use plan
Limpopo: Capricon Municipality Agri -hubs	Soil survey & land use plan
Mozambique: Grudja Jatropha project	Soil survey & land use plan
Gauteng: Land capability whole province	Ground truthing desktop study
Gauteng: Wonderboom Airport	Soil survey land capability assessment
Springs: Umthombo Grootvally	Soil survey & land use plan
Kyalami AH on holdings 5 to 10	Soil survey land capability assessment

Rural Integrated Engineering, Pretoria

Project description	**Own Contribution**
Limpopo, Tzaneen: Thabina Irrigation project	Land use plan
Northwest, Brits: Snymansdrift communal land: Irrigation schemes inventory	Soil potential assessment and Landuse plan
Audit of Irrigation Schemes for DWAF	Physical audit and stock taking of Irrigation Scheme infrastructure at the following dams: Loskop, Hartebeespoort, Buffelspoort, Bospoort, Roodekopjes and Vaalkop

Africa Land-Use Training, Modimole

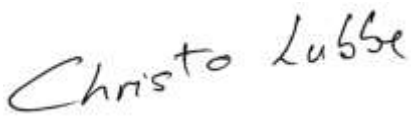
Project description	**Own Contribution**
Basic Farm Planning Coarse (Limpopo and Gauteng)	Lectures on Map reading, Natural resource field data collection, GPS as a tool, Plotting data on map, Infrastructure planning

Appendix C

Declaration of Independence

CR Lubbe was appointed by RE Capital 3 (Pty) Ltd via Cape Environmental Assessment Practitioners (Pty) Ltd, the EAP, to conduct an independent agricultural impact assessment for the proposed PV Power Station in the Northern Cape.

He is not a subsidiary or in any way affiliated to RE Capital 3 (Pty) Ltd. CR Lubbe also does not have any interest in secondary developments that may arise from the authorisation of the proposed project.



CR Lubbe

24 July 2013