

75MW KLOOFSIG PV SOLAR FARM (PHASE 1)



STORMWATER MANAGEMENT AND EROSION CONTROL REPORT

PROJECT NO.: R2004-SW & EC/01

(on Remainder of Farm 18, Kalkpoort, near Petrusville, Northern Cape Province)

(FOR SUBMISSION WITH PROJECT EIA APPLICATION :
DEA Ref: 14/12/16/3/3/2/951)

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CONTENTS	PAGE NO
1 INTRODUCTION	5
1.1 Background Information	5
1.2 Terms of Reference	5
1.3 Purpose of the Report	6
1.4 Limitations of the Report	6
2 SITE LOCALITY AND DESCRIPTION	6
2.1 Site Locality of Phase 1	6
2.2 Site Climate	7
2.3 Site Topography	7
2.4 Hydrology and Catchment Areas	9
2.5 Site Stability	9
2.6 Vegetation and Flora	9
2.6.1 Southern Highland Karoo on red soil.....	10
2.6.2 Southern Plains Karoo on Calcareous Soil	10
2.6.3 Southern Bottomland Karoo	11
3 STORMWATER MANAGEMENT	11
3.1 Generic Stormwater Management Principles	11
3.2 Site Specific Storm Water Management Principles	12
3.2.1 Concept Planning : Roadways	12
3.2.2 Borrow Pit Requirements.....	13
3.2.3 Concept Planning : Storm Water Infrastructure.....	13
3.3 Impact on Drainage Area for Phase 1	14
3.4 Site Clearance and Stripping of Topsoil	15
3.5 Storm Water Erosion Mitigation Measures	16
4 EROSION CONTROL	17
5 STREAM CROSSINGS	18
5.1 Location of Existing Stream Crossings	18
5.2 Condition of Existing Stream Crossings	19
5.3 Proposed Upgrading Work at Stream Crossings	19
5.3.1 Practical construction principles	20

6 RECOMMENDATION 20

7 CONCLUSION..... 21

ANNEXURES :

Annexure A : Maps and Drawings

1 INTRODUCTION

1.1 Background Information

Kloofsig Solar (Pty) Ltd intends to develop a **75MW Photo Voltaic Solar energy facility**, on the Remainder of Farm 18, Kalkpoort (RE/18), located within the Pixley Ka Seme District Municipality and the Renosterberg Local Municipality, near Pertusville town in the Northern Cape Province.

The proposed development consists of **three separate project phases** of 75MW each (with a total power generation capacity of 225 MW should all phases be developed), covering a total area of approximately 970ha. A preliminary Site Development Plan (SDP) indicating the location of each phase is shown in Annexure A and briefly described below.

- **Kloofsig 1** (DEA reference number 14/12/16/3/3/2/951) is at the centre of the site and covers approximately 209,3ha and includes typically 275 000 of 300Watt PV-panels, a new 132kV powerline (approximately 8.5km long) and a new substation No.1 to connect to the existing 132kV over-head powerline, running to the south-east of the site. An on-site substation and short connection to the existing 400kV powerline crossing the site is also proposed as part of Phase 1 (this infrastructure will support all phases of the development, should they be developed).
- **Kloofsig 2** (DEA reference number 14/12/16/3/3/2/952) is on the northern side of the site and covers approximately 243,8ha and includes typically 275 000 of 300Watt PV-panels and includes the new substation No.2 and a connection to the existing 400kV powerline crossing the site, similar as described for Kloofsig 1.
- **Kloofsig 3** (DEA reference number 14/12/16/3/3/2/953) is on the southern side of the site and covers approximately 495,9ha and includes typically 275 000 of 300Watt PV-panels and includes the new substation No.3 and a connection to the existing 400kV powerline crossing the site, similar as described for Kloofsig 1.

This Stormwater Management and Erosion Control Report covers only the impacts of the Kloofsig PV Solar Phase 1 Development. Similar reports are compiled for the Phase 2 and Phase 3 developments separately, emphasising on the separate and cumulative impacts, should all 3 phases be developed.

1.2 Terms of Reference

Kloofsig Solar (Pty) Ltd appointed AfriCoast Consulting Engineers (Pty) Ltd to carry out professional engineering services related to the development of the proposed Solar farm. This Storm Water Management and Erosion Control Report **forms an integral part of the supportive documentation required for the Environmental Impact Assessments (EIA) and application to DEDEAT.**

1.3 Purpose of the Report

The purpose of this report is to investigate and to comment on the current site conditions and expected impacts or changes, due to expected storm water run-off characteristics. The solar farm development, specifically the ring roads, the internal access roads and the proposed hard surface footprint areas for the arrays of PV panels and electrical sub-stations, will all change the topography and may impact on the natural storm water run-off characteristics of the landscape.

Gradients are a concern when managing storm water run-off, and ensuring sufficient erosion protection at exposed slopes. Hence, recommendations are needed to guide the detail design stage, ensuring that the landscape, cut and fill embankments, vegetation clearance and water courses are all protected against excessive storm water run-off, and that good Stormwater Management principles will be set in place during the construction stage, for both permanent and temporary construction areas. It is also important that the design will focus not to unnecessarily increase the concentration of storm water run-off, during and after construction.

1.4 Limitations of the Report

No detail designs have been done yet, and *only a preliminary Site Development Plan (SDP) was compiled to date*. This report therefore does not present or discuss any detail designed infrastructure, but is limited to highlight concepts related to storm water management and erosion control, which need to be addressed during the Detail Design Stage. Road gradients (longitudinal and cross-fall) and Storm Water channels, and related storm water run-off velocities, have not yet been calculated.

Information on the soil and sub-strata conditions of the development are based on visual inspections and available site photos. Soil conditions are relatively consistent, but further site excavations, may expose different soil conditions which may be more prone to erosion and wash-aways of fine materials (sand and silt).

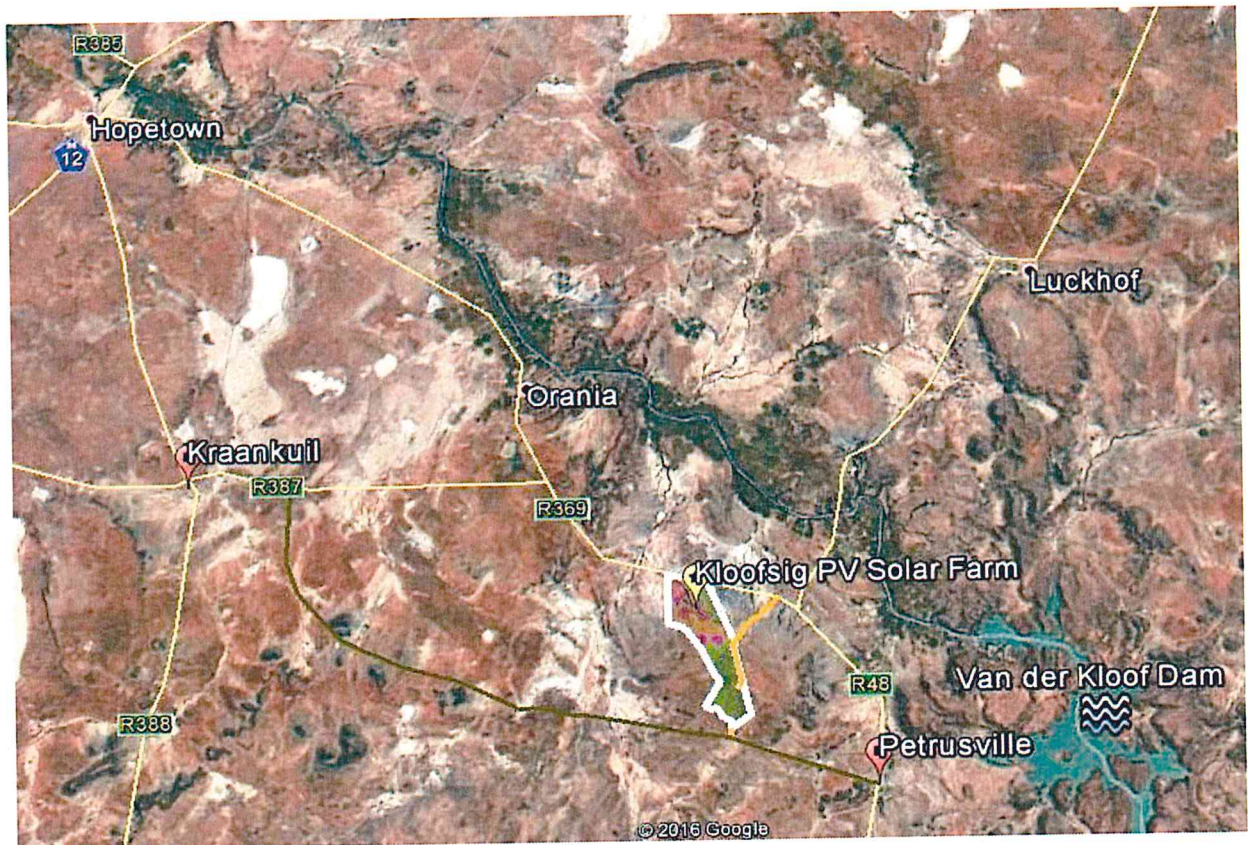
2 SITE LOCALITY AND DESCRIPTION

2.1 Site Locality of Phase 1

The Kloofsig Solar Farm (Phase 1) is proposed on the same farm than the other two proposed phases (Phase 2 and Phase 3), located at approximately 10 to 15km north-west of Petrusville, and approximately 140km south of Kimberley, in the Northern Cape Province (refer to **Map 1** below).

The **Phase 1** site boundary is positioned between coordinates:

- *Latitude:* 30°00'13.69"S and 30°01'09.68"S and
- *Longitude:* 24°32'30.44"E and 24°33'40.10"E.



Map 1: Locality map of the proposed 3x 75MW solar farm developments.

2.2 Site Climate

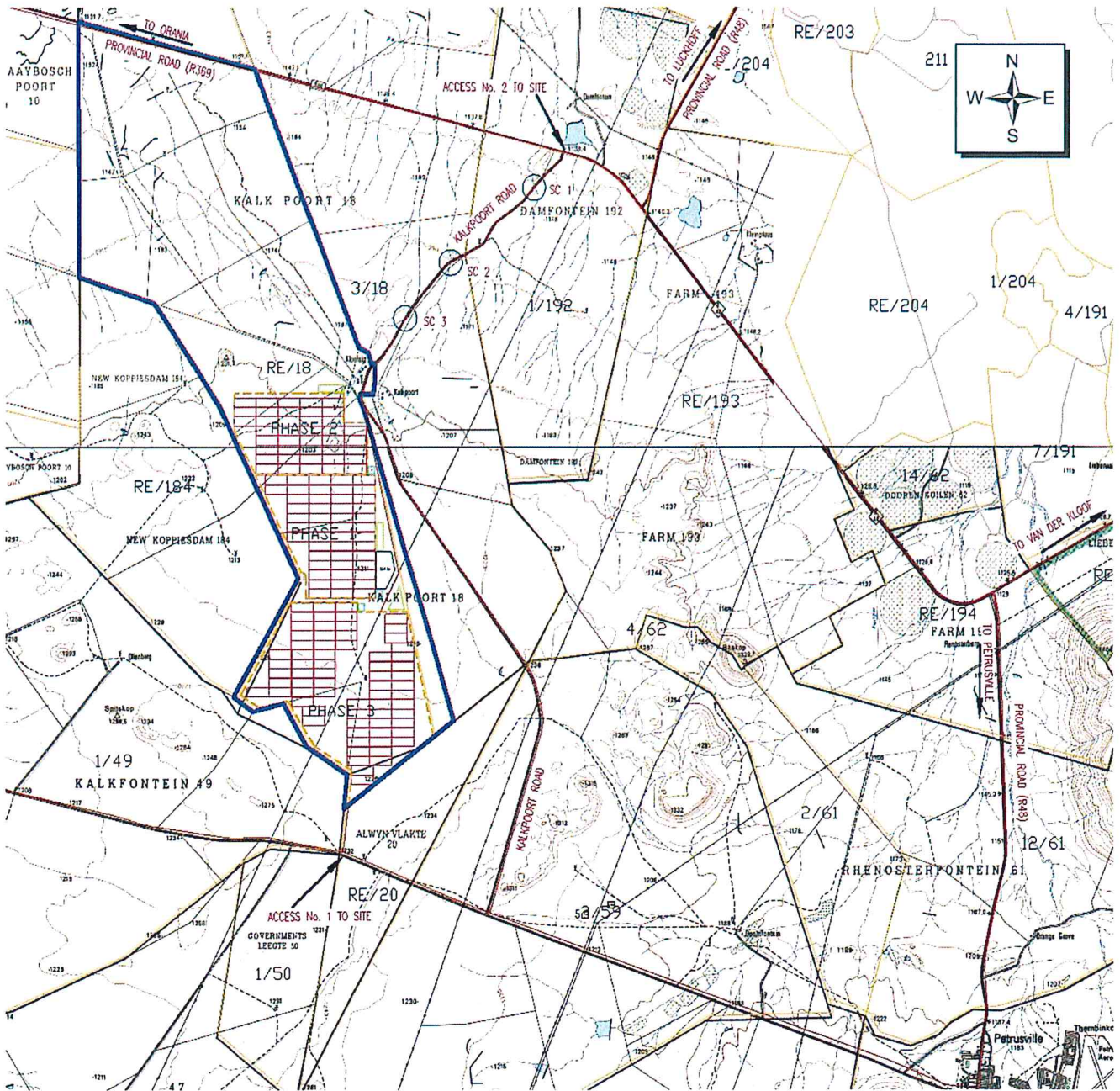
The weather of the Northern Cape is typically that of desert and semi-desert areas. It is a generally hot and dry region with fluctuating temperatures and generally low rainfall. Evaporation levels exceed the annual rainfall which varies between 50 mm and 400 mm - the average annual rainfall over the Province is 202mm (MAP). The central, northern and eastern parts of the Province receive rain primarily during the summer months (December to February). Summer temperatures often top the 40°C mark in most of the Province, with temperatures as high as 48°C having been recorded along the Orange River. During winter average day temperatures are below 20°C.

Thunder-shower events occurs seldom and measuring only a few millimetre of precipitation per event. Continuous long rainfall events are rare. Storms are relatively brief, with peak intensities over 5, 10 and 15 minutes occur. Mean humidity in the region is of the lowest in South Africa.

2.3 Site Topography

The Kloofsig solar farm area is predominantly flat with gradient less than 1%, sloping to the north. The average elevation of the development area range from 1200 to 1240 meters above sea level (masl), with some soft rolling hills and dry non-perennial water course channels in the north, not affecting the footprint of the proposed development. Small rocky koppies are located around the farm, however these do not affect the proposed solar farm at all. Refer to extract below, of the **1:50 000 Topographical Maps 2924DC and 3024BA.**

The site is therefore well suited for the development of a PV Solar Energy facility.



REFERENCE		REFERENCE	
National Freeway; National Route		International Boundary and Beacon	
Arterial Route		Provincial Boundary	
Main Road		Game, Nature Reserve & State Forest Boundary	
Secondary Road; Bench Mark		Perennial River	
Other Road; Bridge		Perennial Water	
Track and Hiking Trail		Non-perennial River	
Railway; Station or Siding		Non-perennial Water	
Other Railway; Tunnel		Dry Water Course	
Embankment; Cutting		Dry Pan	
Power Line		Marsh and Vlei	
Built-up Area		Pipeline (above ground)	
Buildings; Ruin		Water Tower; Reservoir; Water Point	
Post Office; Police Station; Store		Coastal Rocks	
Place of Worship; School; Hotel		Prominent Rock Outcrop	
Fence; Wall		Erosion; Sand	
Windpump; Monument		Woodland	
Communication Tower		Cultivated Land	
Mine Dump; Excavation		Orchard or Vineyard	
Trigonometrical Station; Marine Beacon		Recreation Ground	
Lighthouse and Marine Light		Row of Trees	
Cemetery; Grave			

Map 2: Extracted Topographical Map (Refer to 1:50 000 Topographical Maps 2924DC and 3024BA).