BRYPAAL SOLAR POWER (PV) PROJECT
NOVEMBER 2017

Topography Specialist Report

Remainder of Portion 4 of the farm Brypaal No. 134

Division Kenhardt
Northern Cape Province

Prepared for:
Vintage Energy Pty (Ltd)

Ground Floor; Block B

Homestead Park

37 Homestead Road cnr 12th Ave

Rivonia

2128

Prepared by:
Boscia Environmental Solutions

Boscia Environmental Solutions
10 Borrius Street
Potchefstroom
2531

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Reg. no. 2016/197794/07
VAT no. 462 0277 246

TITLE AND APPROVAL PAGE

Project Name	EIA for the proposed development of a 100 MW PV Solar Facility on the farm Brypaal, Northern Cape Province.
Report Title	Topography Specialist Report
DEA Reference	14/12/16/3/3/2/1019
Report Status	Final

Client	Vintage Energy Pty Ltd
Client Representative	Mr. Jan Du Preez

Prepared by	Boscia Environmental Solutions	
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Report Reference		2017/BES/SR/02

Authorisation	Name	Signature	Date
Author	Frik Erasmus		22 November 2017
Approved by			
Author's Affiliations	See Appendix A		

CONTENT

DESCRIPTION OF THE TOPOGRAPHY OF THE BRYPAAL PV SOLAR PROJECT FOCUS AREA

PART A

1. (1) A specialist report prepared in terms of these Regulations must contain-

(a) details of-
(i) the specialist who prepared the report; and

EAP:	**Mr. Frik Erasmus**		
Professional affiliation/registration:	**South African Council for Natural Scientific Professions (SACNASP):** **Prof. Nat. Sci. : 400120/05**		
Contact person (if different from EAP):	**Me. Cindy Faul**		
Company:	**Boscia Environmental Solutions C.C.**		
Physical address:	**10 Borrius Street , Potchefstroom, 2531**		
Postal address:	**10 Borrius Street , Potchefstroom, 2531**		
Postal code:	**2531**	Cell:	
Telephone:		Fax:	
E-mail:	**sumsar@worldonline.co.za** **cindyfaul35@yahoo.com**		

(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;

The EAP, Mr. Erasmus has been involved in environmental studies, research, environmental management, compilation of Basic assessments EIA/EMP'S, EMP environmental auditing for the past 30 years.

Qualifications (Highest):

M.Sc. (Geography); M.Sc (Environmental Management & Analyses) Prof. Natural Scientist (Reg. No. 400120/05) SACNASP; Member of the IAIASA (See C.V for more detail in Appendix A).

(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;

I , Frederik Johannes Erasmus declares, that I am an independent specialist that do not have any vested interest in the project.

(c) an indication of the scope of, and the purpose for which, the report was prepared;

Description of the topography of the study area has been done by using existing info sources such as topographical map 2920ab, Terrain morphological map of South Africa, satellite imagery (Google Earth), existing info from the ARC GIS maps, determine the average slope along several sections throughout the project focus area. The project site has been visited and terrain morphology verified (Slope measured with a clinometer. Photos have been taken of the site at several locations).

See description of topography (page).

It is important to describe the topography of the PV project focus area as certain limitation such as ,steep slope surface areas, can hamper the construction of the facility. Flatter slope surface areas are being preferred. This means also a far smaller disturbance by ground works/site preparation activities. This also means a far smaller disturbance of the vegetation cover and smaller disturb surface area that could be possible be prone to erosion. All this has a impact on cost of site preparation for construction of the PV facility and related infrastructure.

(cA) an indication of the quality and age of base data used for the specialist report;

Description of the topography of the study area has been done by using existing info sources such as topographical map 2920ab (from the Chief Directorate : Surveys and mapping, Mowbray, S.A.). Terrain morphological map of South Africa, satellite imagery (Google Earth) (2016), existing info from the ARC GIS maps.

(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;

Existing impacts are related to farming with particular reference to the utilization of the site for grazing for sheep. An small piece of the site is being occupied by a quarry (provincial roads department), resulting in a change in topography through the creation of a depression.

The topography on the focus area for the PV solar project will be altered to a minimum as the topography is flat and will involve the minimum earth works during site preparation.

(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;

An site visit was conducted during July 2016. Majority of topographical info is also being obtained from exiting 1: 50 000 topographical map 2920ab and satellite imagery. The outcome of the assessment is not dependant on what season it is.

(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;

Description of the topography of the study area has been done by using existing info sources such as topographical map 2920ab, Terrain morphological map of South Africa, satellite imagery (Google Earth), existing info from the ARC GIS maps, determine the average slope along several sections throughout the project focus area. The project site has been visited and terrain morphology verified (Slope measured with a clinometer. Photos have been taken of the site at several locations).

The specialist report will form part of the EIA Report as an Appendix.

(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;

It is important to describe the topography of the PV project focus area as certain limitation such as ,steep slope surface areas prone to erosion (high surface run-off) , can hamper the construction of the facility. Flatter slope surface areas are being preferred.

According to the Terrain morphological map of Southern Africa (G.P.Kruger , Dept. of Agriculture, Pretoria: 1983) the PV focus surface area occurs within the terrain morphological class A(1) that is being described " Flat plains with low relief". The percentage of area with slope less than 5% is more than 80%.

The majority of the surface area is described a flat (see GOOGLE EARTH SLOPE ANALYSES OF THE PROJECT AREA USING SATTELITE IMAGERY) with average slopes of 0,3%, 0,8% and 0,9 % etc. (See part B). This makes the project site an ideal focus area for the PV solar project.

(g) an identification of any areas to be avoided, including buffers;
Topographical features that need to be avoided are **"dry stream water courses**" that are draining towards the Salt River. The majority of the proposed project area (study area) lies between 860-880m above sea level and sloping towards the western side with a height of 860m towards 840m above sea level. The project area on the western side is more dissected by dry water courses, draining the project surface area towards the Sout River. **See map (Part B).**
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;
See Part B for topographical map indicating " dry water courses" that forms part of the Salt River drainage basin that should be avoided. The majority of the proposed project area (study area) lies between 860-880m above sea level and sloping towards the western side with a height of 860 towards 840m above sea level. The project area on the western side is more dissected by dry water courses, draining the project surface area towards the Sout River.

(i) a description of any assumptions made and any uncertainties or gaps in knowledge;
None.

(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;

<table>
<tr><td>ASPECT
2. TOPOGRAPHY</td><td colspan="8">IMPACTS</td></tr>
<tr><td>Nature of the impact</td><td colspan="8">* Change in landform :
The existing topography is described as flat with some rock outcrops (rock plates) and the majority of infrastructure required for the PVSP project would have an permanent impact on topography. Some infrastructure (contractor lay–down area) will be temporary on site. Construction rock material and topsoil will be stored in temporary stockpiles for construction purposes.

An terraced landscape will be created (where required) to serve as the footprint of the different components of the PVSP project.

* Disturbance of the surface drainage:
Construction material will be obtained from newly established quarries on site that is going to be used as filling material during initial ground works on the proposed PVSP project site. It is expected that some cut and fill workings will take place in the construction of certain project components (trenches, canals, evaporation dams, access roads, etc. Quarries , trenches, canals , will act as that act as depressions in the environment that captures run-off (standing water).

Normal surface drainage will be disturbed at a given point. Run-off if will be diverted away from the site (surface run-off control structures).

The majority of infrastructure will remain for a estimated project life of 20-25 years. During closure the site will be rehabilitated and all infrastructure demolished. At closure certain infrastructure components could possible identified to be used in the future by the land owner .</td></tr>
<tr><td>Extent</td><td colspan="4">Site</td><td colspan="4" rowspan="2">Listed activity causing the</td></tr>
<tr><td>Duration</td><td colspan="4">Very long to Permanent</td></tr>
<tr><td>Probability</td><td colspan="4">Definite</td><td rowspan="3">GN325</td><td rowspan="3">GN327</td><td rowspan="3">GN324</td></tr>
<tr><td>Significance</td><td colspan="4">High</td></tr>
<tr><td rowspan="2">Phase responsible for the impact</td><td>Construction</td><td>Operational</td><td>Decommissioning</td><td>Closure</td></tr>
<tr><td>X</td><td>X</td><td></td><td></td><td>1</td><td>11,12,13
14, 19</td><td>4</td></tr>
</table>

(k) any mitigation measures for inclusion in the EMPr; **(l) any conditions for inclusion in the environmental authorisation;** **(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;**
(For k & m) The surface area required for the PV project and associated infrastructure should be selected and demarcated by a surveyor with definite beacons and which is correlated with a project plan. No surface should be disturbed unnecessarily. Disturbed surface areas should be rehabilitated. No silt from such areas should be allowed to end-up in dry stream courses. Berm walls need to be put in place. Daily inspections required during the construction phase.

(n) a reasoned opinion— **(i) whether the proposed activity, activities or portions thereof should be authorised;** **(iA) regarding the acceptability of the proposed activity or activities; and** **(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;**
There is no reason from a topographical point of view that the PV Solar project should not be authorised. The topography makes it ideal for the construction and operation of such a facility on the Brypaal project focus area**.** The surface area required for the PV project and associated infrastructure should be selected and demarcated by a surveyor with definite beacons and which is correlated with a project plan. No surface should be disturbed unnecessarily. Disturbed surface areas should be rehabilitated. No silt (soil), as the result of erosion of newly disturbed surface areas, should be allowed to end-up in dry stream courses. Berm walls need to be put in place.

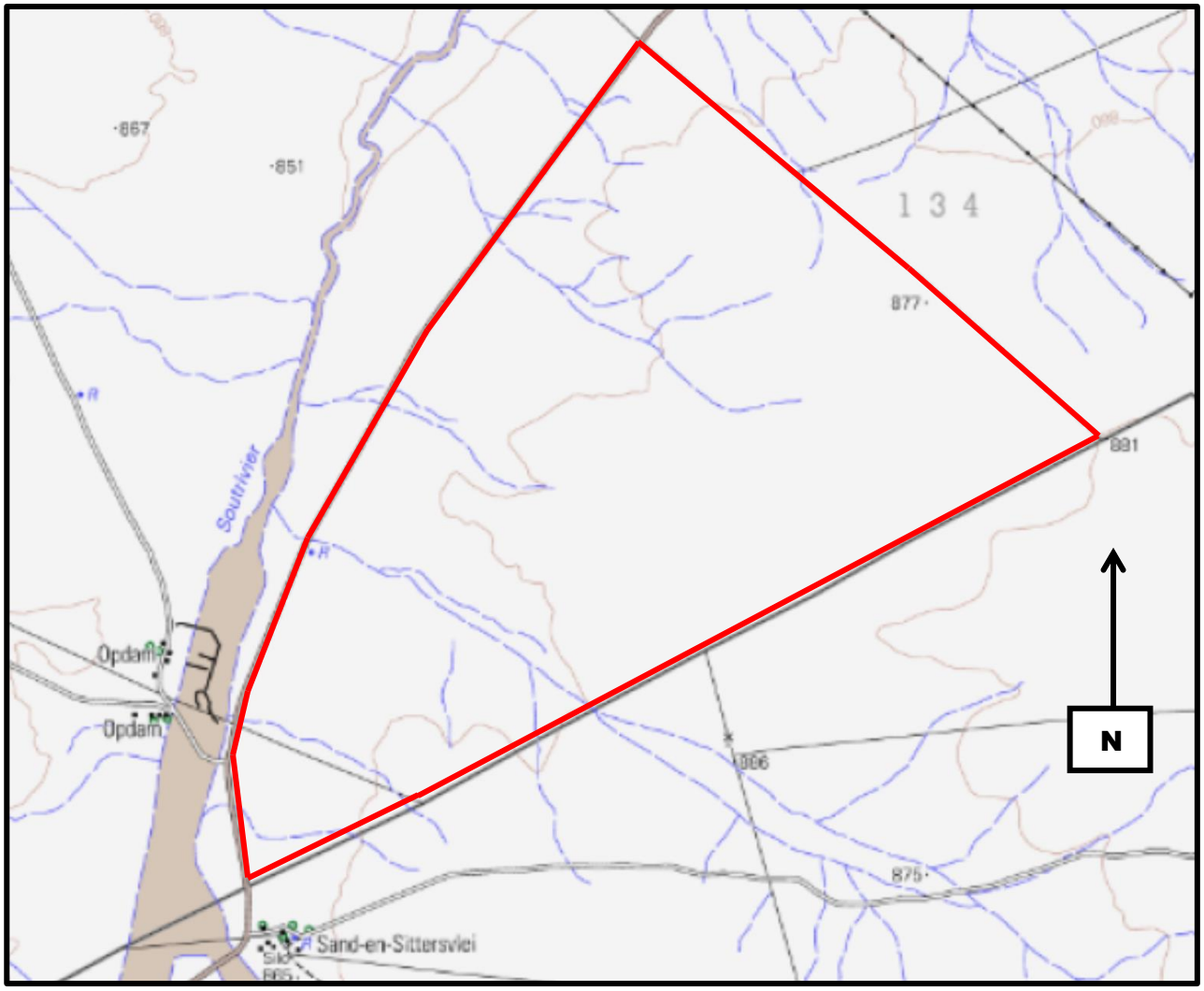
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report; **(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and** **(q) any other information requested by the competent authority.**
The specialist report will ultimately form part of the EIA Report as an appendix. Comments will be invited on the EIA Report documents.

PART B : DESCRIPTION OF THE TOPOGRAPHY OF THE BRYPAAL PROJECT FOUCS AREA

1) General description of the topography of the project focus area:

The terrain morphology of the portion of the farm proposed for the solar development is characterised by a flat plain **sloping from east to west and northeast towards the southwest.** The height of the site project is above mean sea level (m.s.l.) is approximately 877 -853m.

TOPOGRAPHICAL MAP (2920 ab):



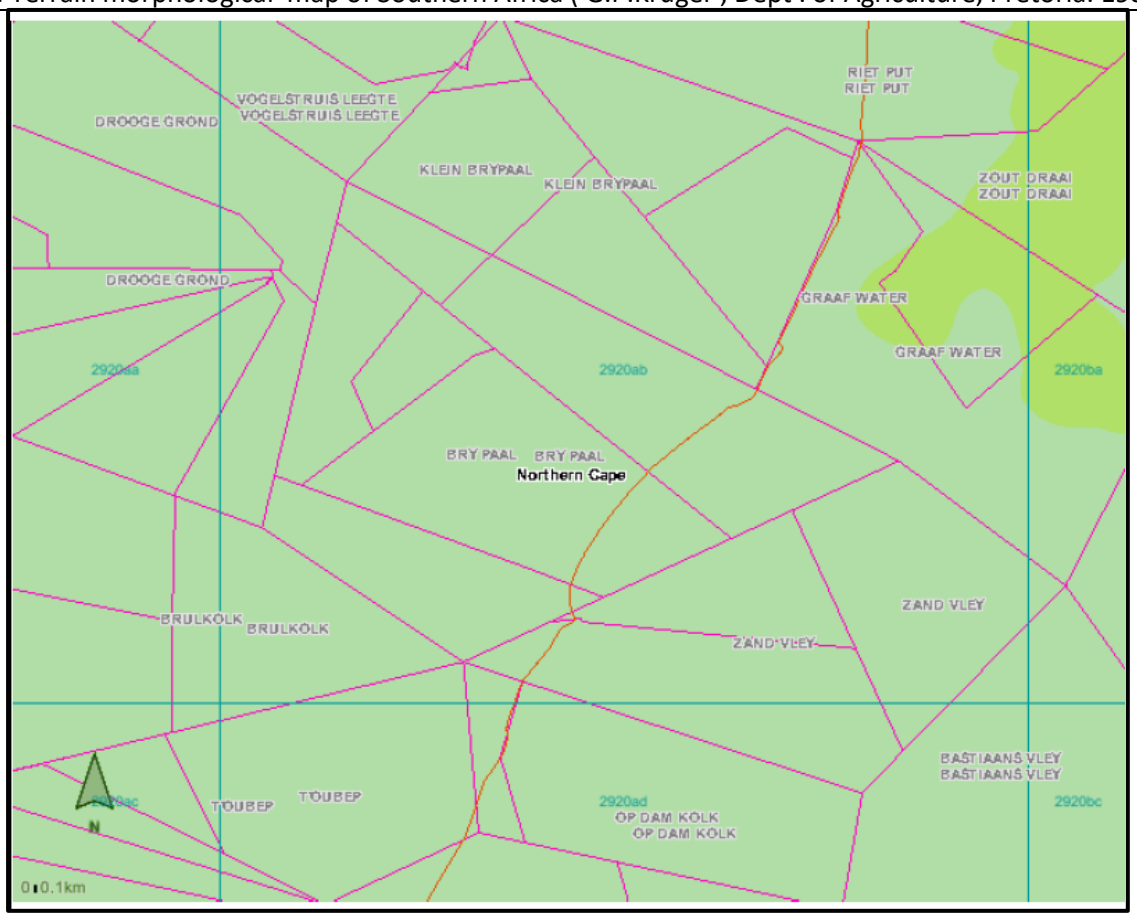
2) SATELITE IMAGE WITH COUNTOUR OVERLAY:

Source: SANBI | BGIS Map Viewer

3) Broad terrain morphological class

The broad terrain morphological class according to the Terrain morphological map of Southern Africa (G.P.Kruger) is as follows:

Terrain morphological classes		
Broad division:		
A(1)	**Plains with low relief**	
	- Slope form	Straight
	Relief	0m to 130m
	Drainage density	Low to medium (0-2 km/km²)
	Stream frequency	Low to medium (0-6 streams /km²)
	Percentage of area with slope less than 5%	More than 80%
Source: Terrain morphological map of Southern Africa (G.P.Kruger , Dept . of Agriculture, Pretoria: 1983)		



Legend:

SOURCE : ARCGIS 2016

Terrain types

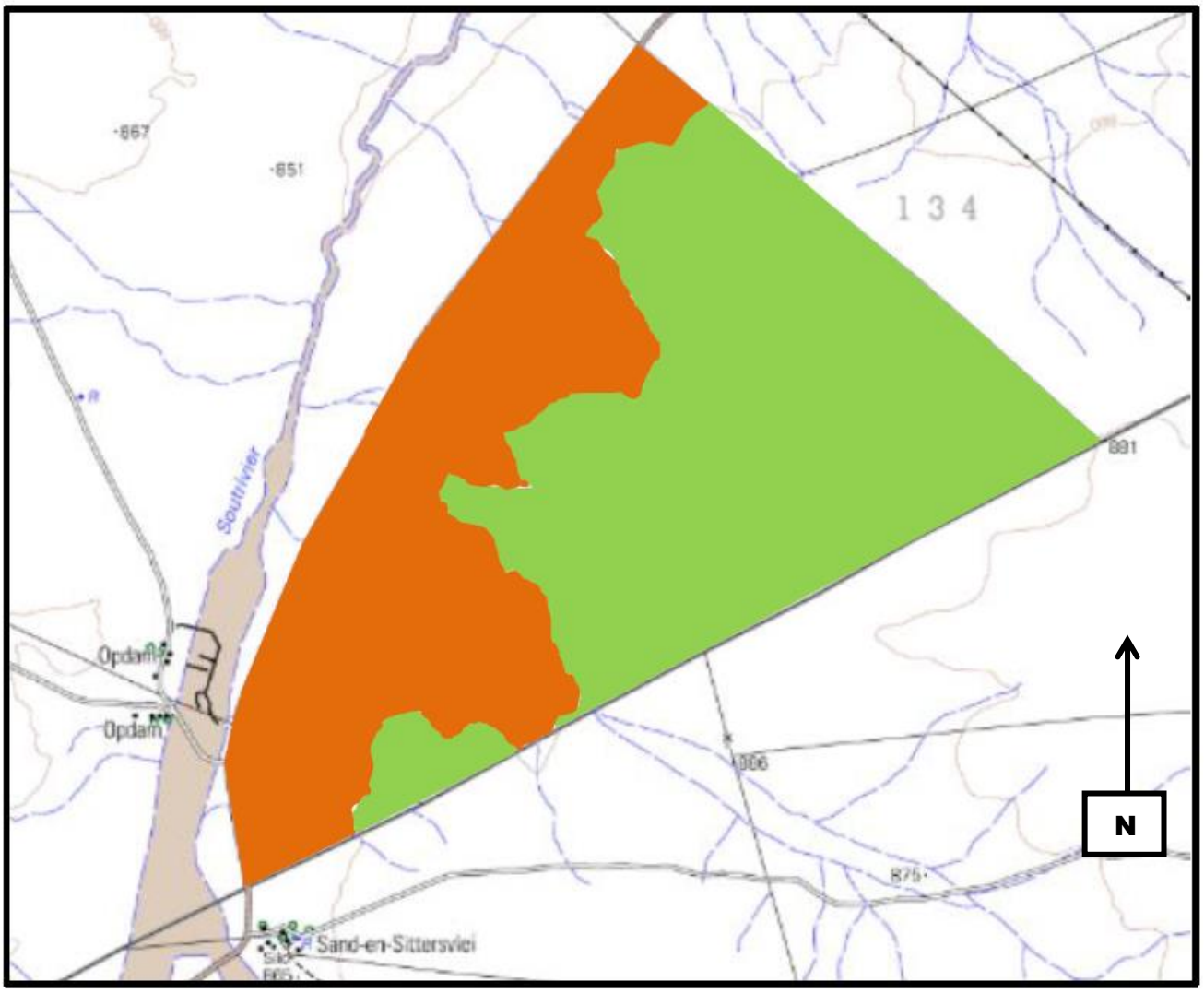
Terrain types

Level plains

Level plains with some relief

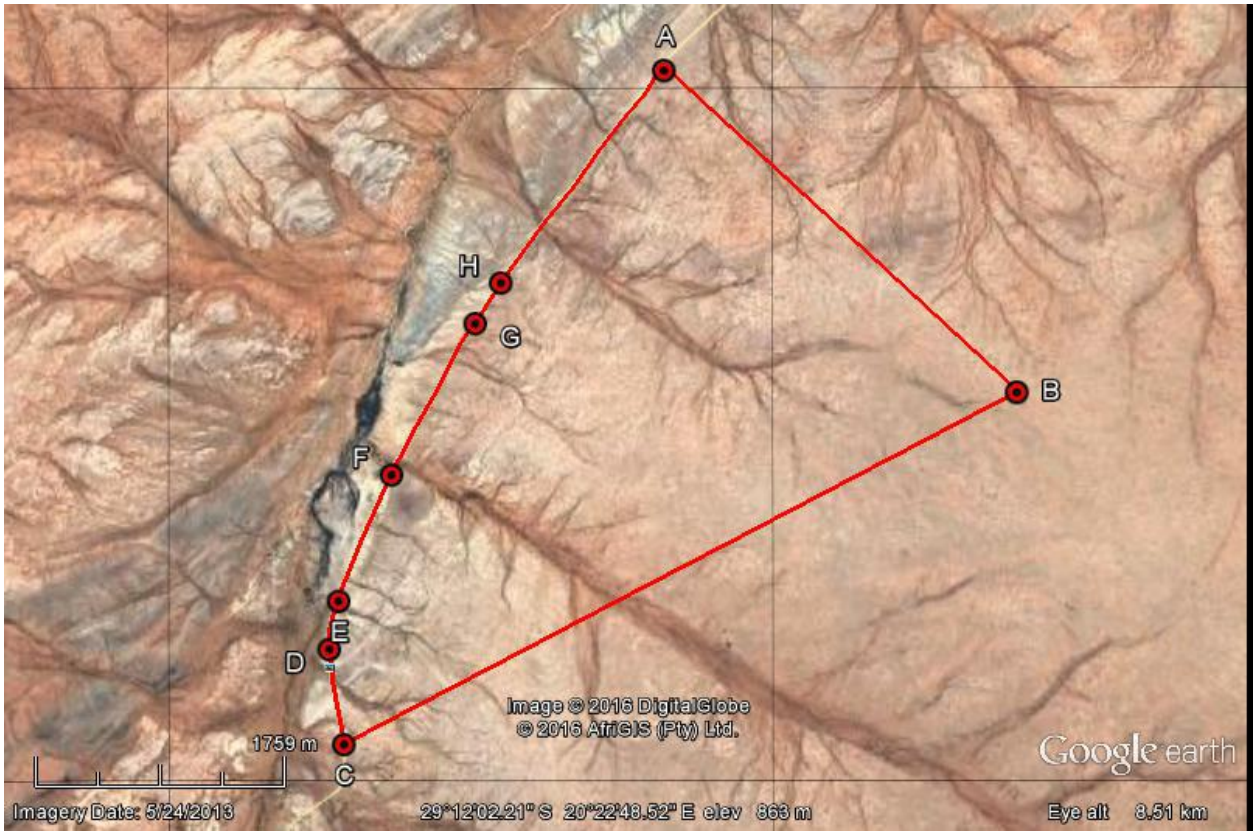
4.1) Detail analyses of the topography of the project focus area:

The majority of the proposed project area (study area) lies between 860-880m above sea level and sloping towards the western side with a height of 860 towards 840m above sea level. The project area on the western side is more dissected by dry water courses, draining the project surface area towards the Sout River.

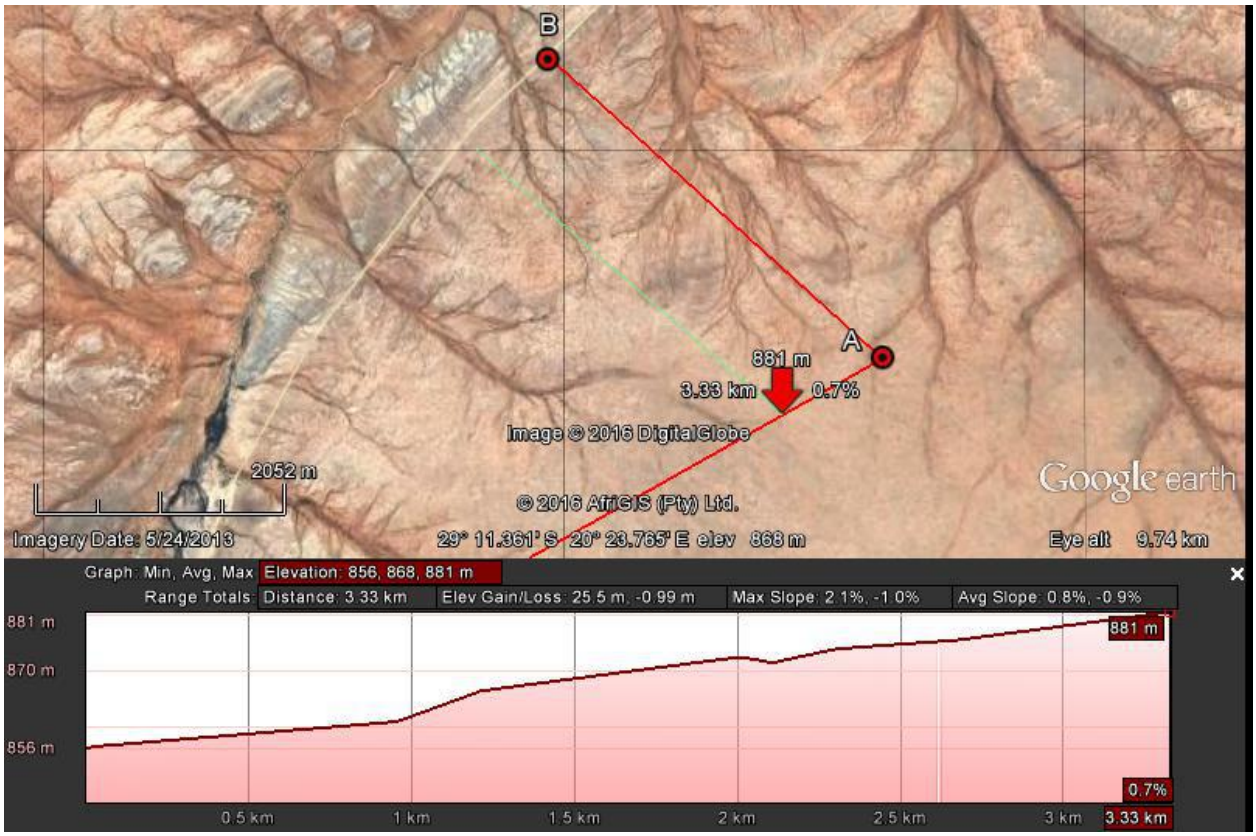


4.2) GOOGLE EARTH SLOPE ANALYSES OF THE PROJECT AREA USING SATTELITE IMAGERY:

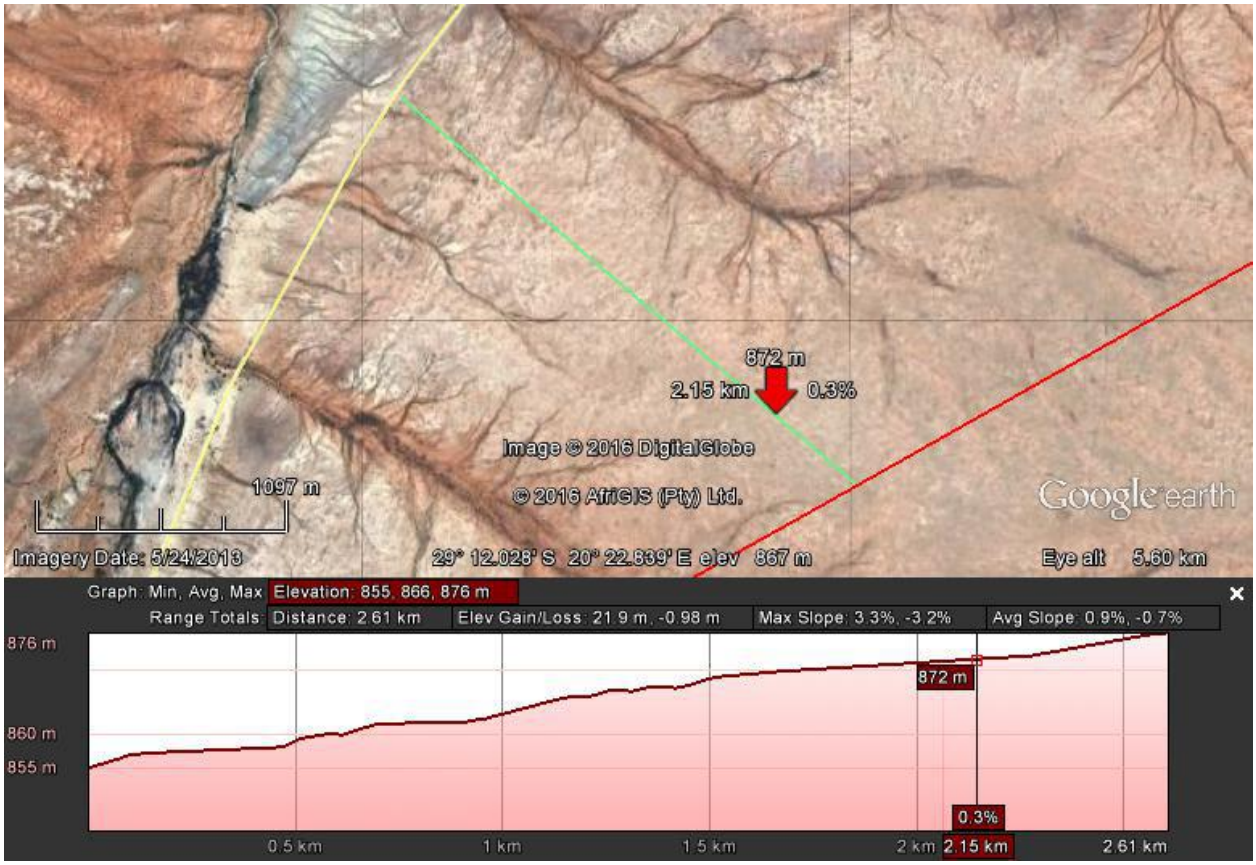
SOLAR PROJECT FOCUS AREA:



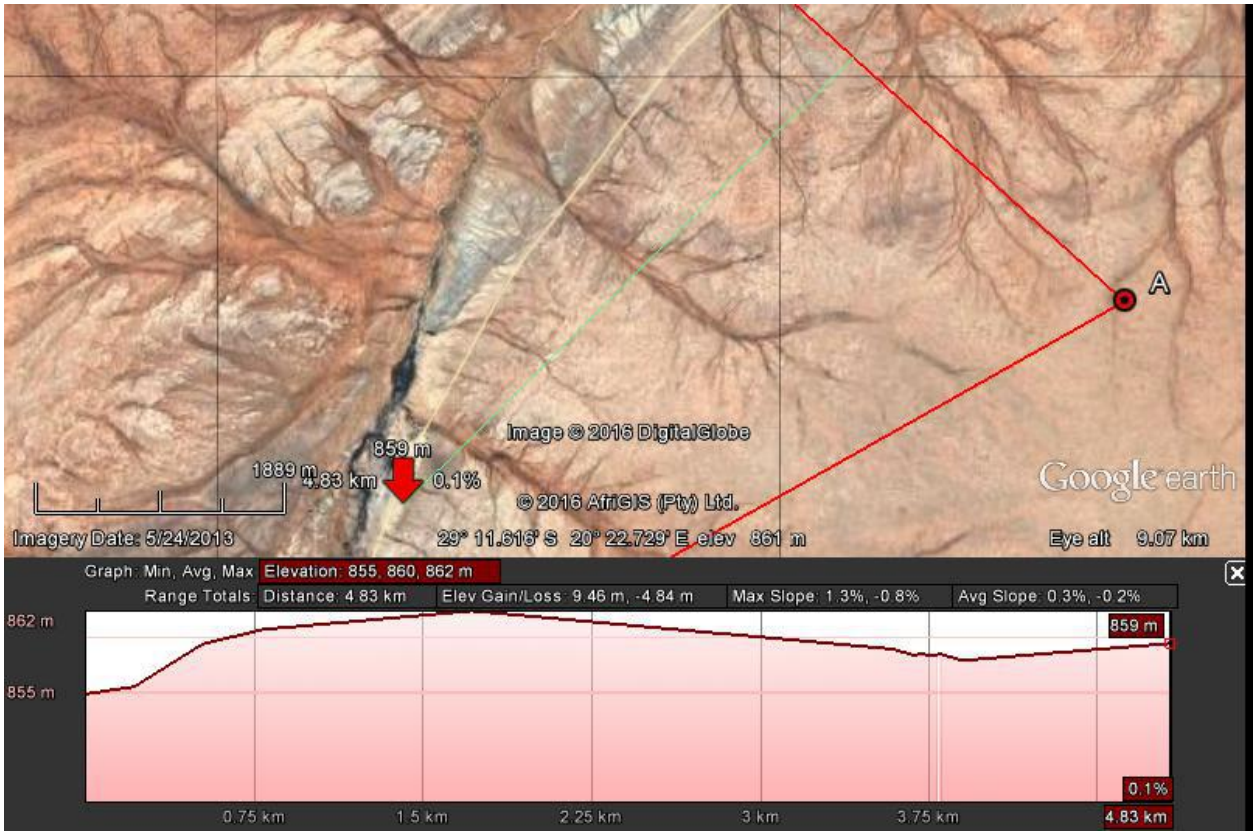
SLOPE PROFILE NO.1:



AVERAGE SLOPE: 0.8%, - 0.9%

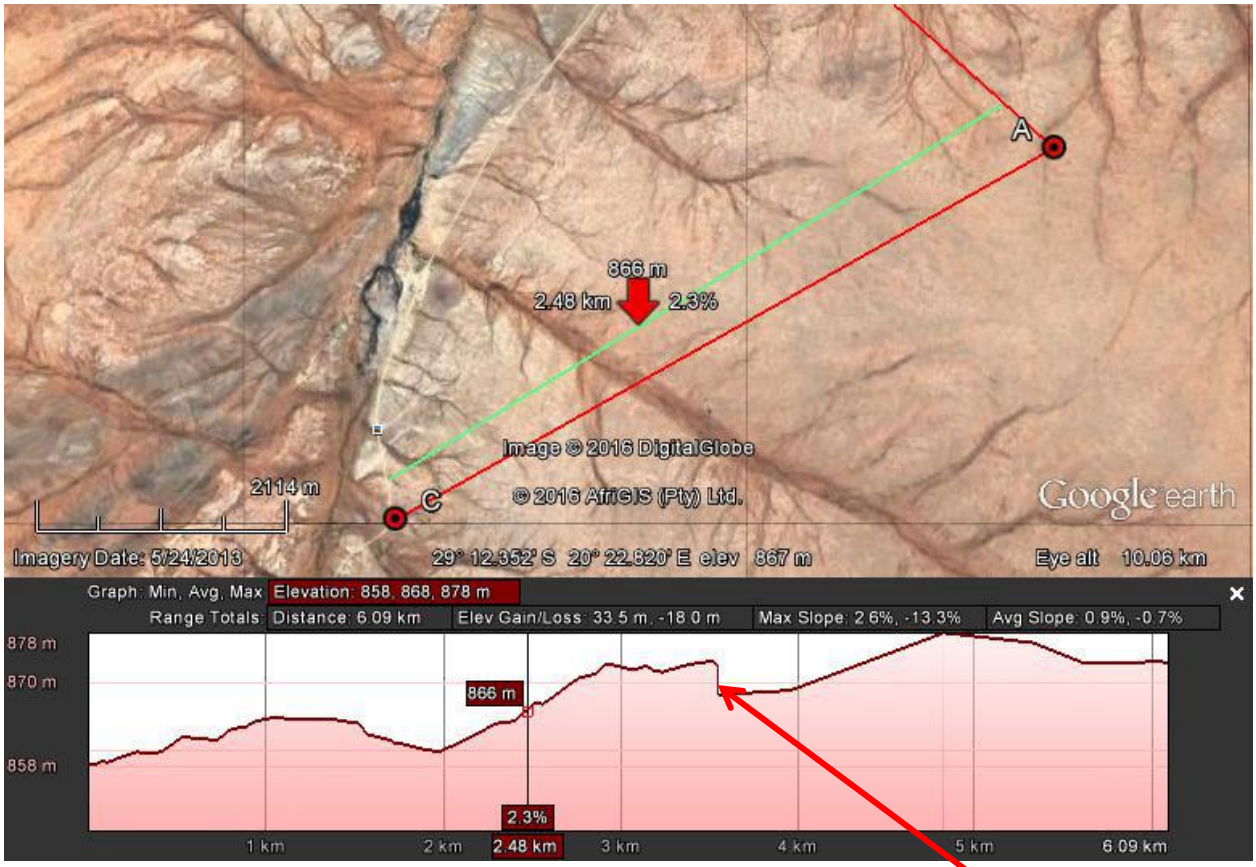

872 m
2.15 km
0.3%
Image © 2016 DigitalGlobe
© 2016 AfriGIS (Pty) Ltd.
1097 m
Google earth
Imagery Date: 5/24/2013
29° 12.028' S 20° 22.869' E elev 867 m
Eye alt 5.60 km
Graph: Min, Avg, Max Elevation: 855, 866, 876 m
Range Totals: Distance: 2.61 km
Elev Gain/Loss: 21.9 m, -0.98 m
Max Slope: 3.3%, -3.2%
Avg Slope: 0.9%, -0.7%
876 m
860 m
855 m
872 m
0.3%
0.5 km
1 km
1.5 km
2 km
2.15 km
2.61 km

SLOPE PROFILE NO.2:



AVERAGE SLOPE: 0.3%, -0.2%

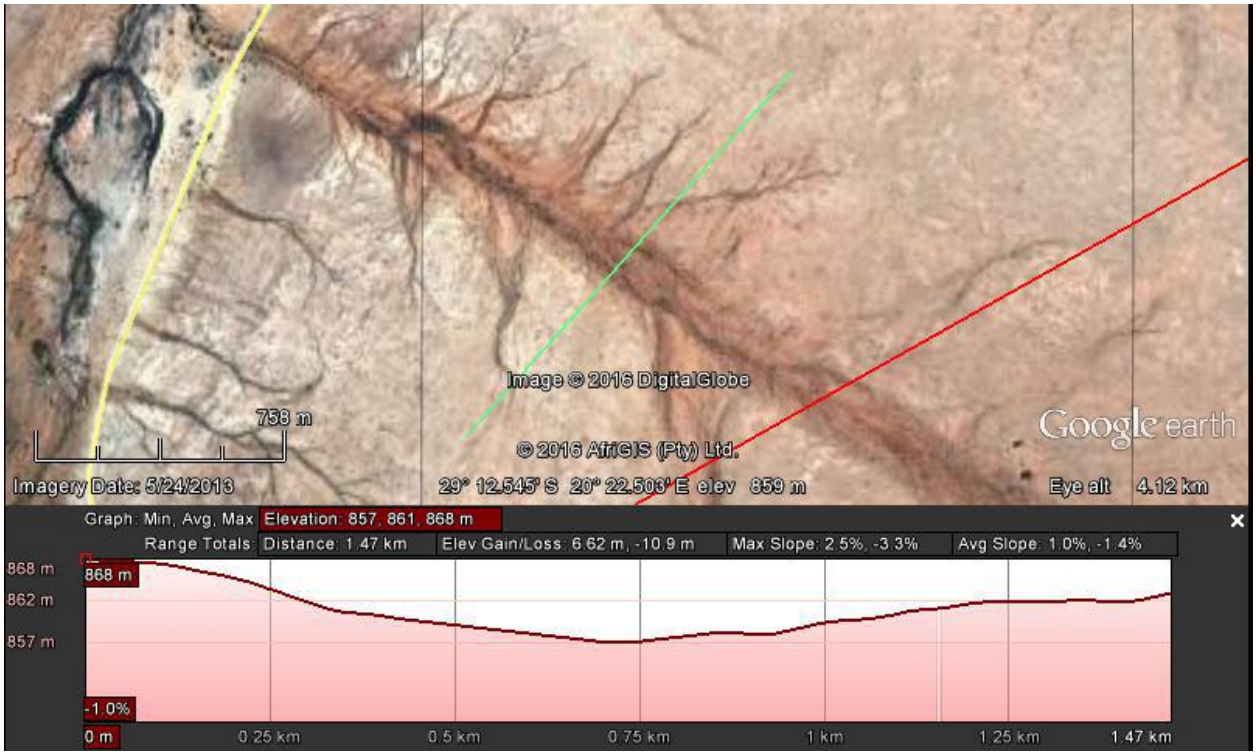
SLOPE PROFILE NO.3:



AVERAGE SLOPE: 0.9 %, -0.7%

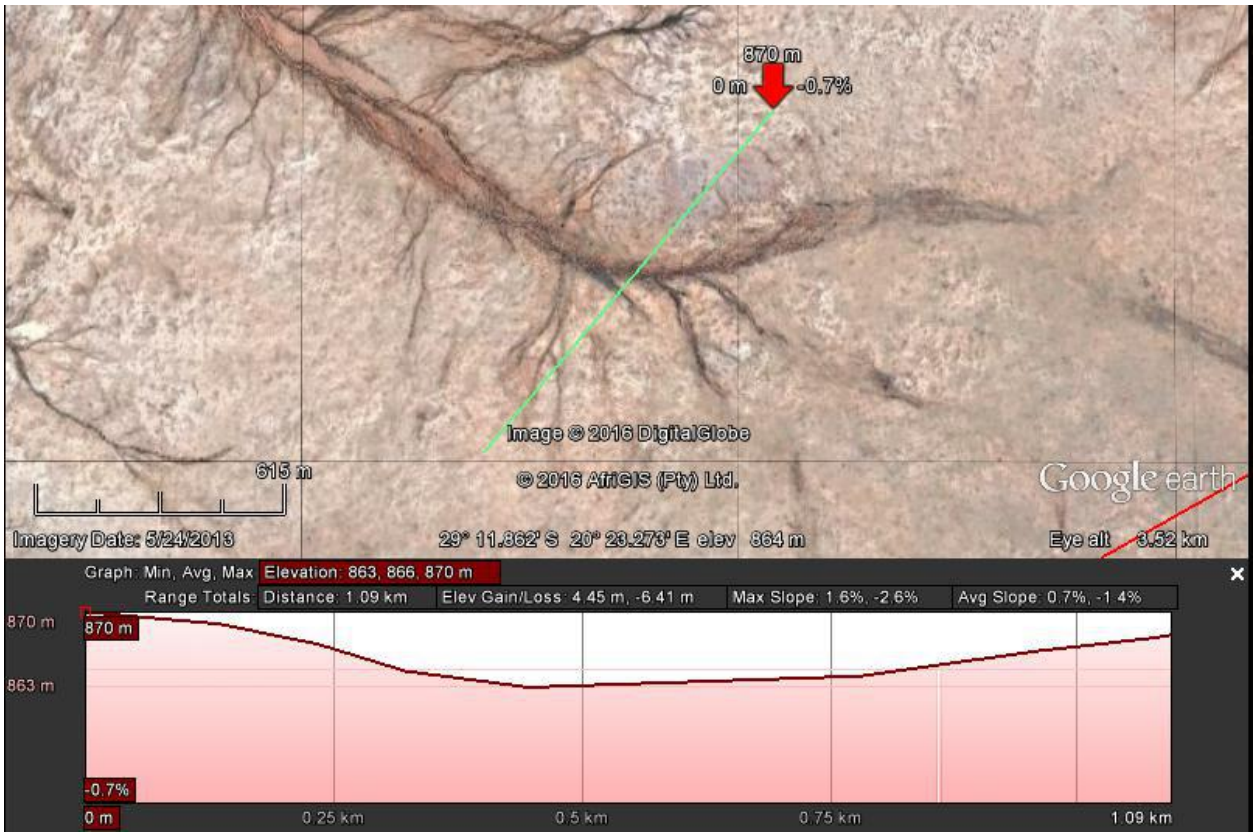
Anomaly/spike in profile due to measurement of line on image

SLOPE PROFILE DRY STREAM 1(A):

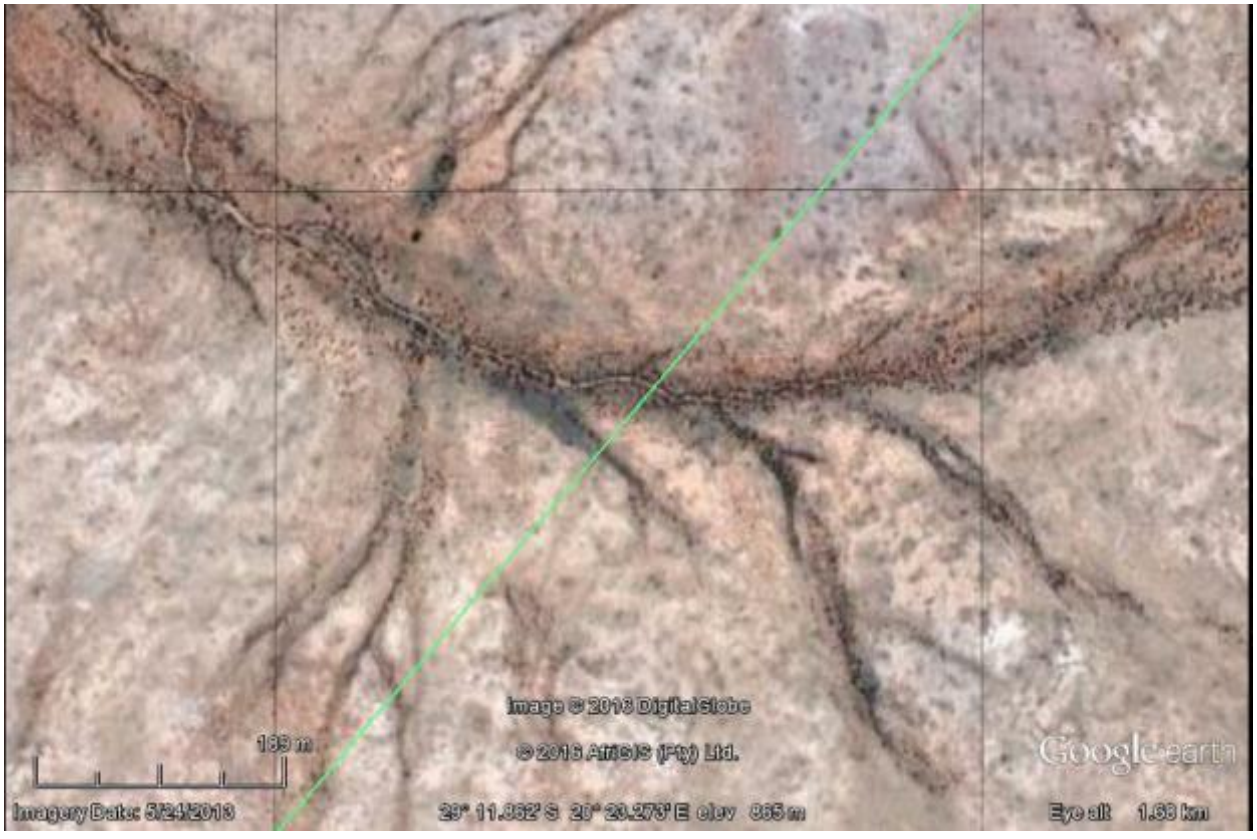


AVERAGE SLOPE: 1.0%, -1.4%

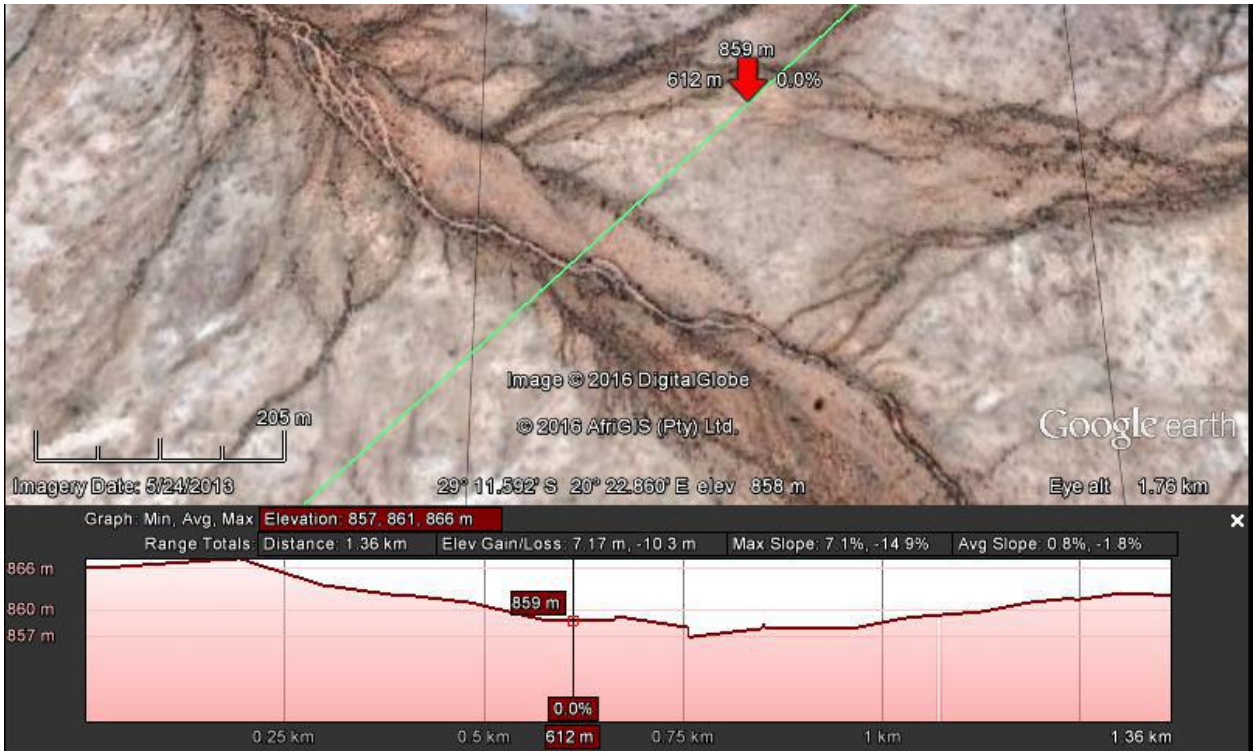
SLOPE PROFILE DRY STREAM 2(A):



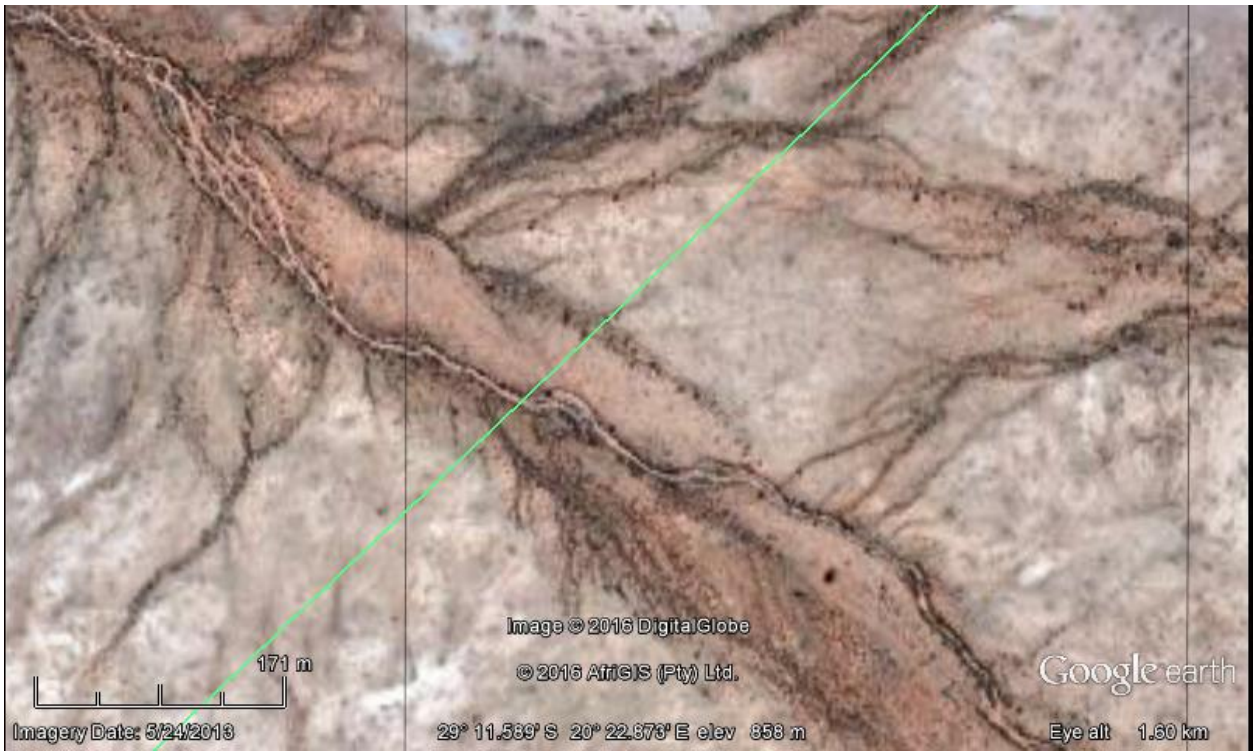
AVERAGE SLOPE: 0.7%, -1.4%



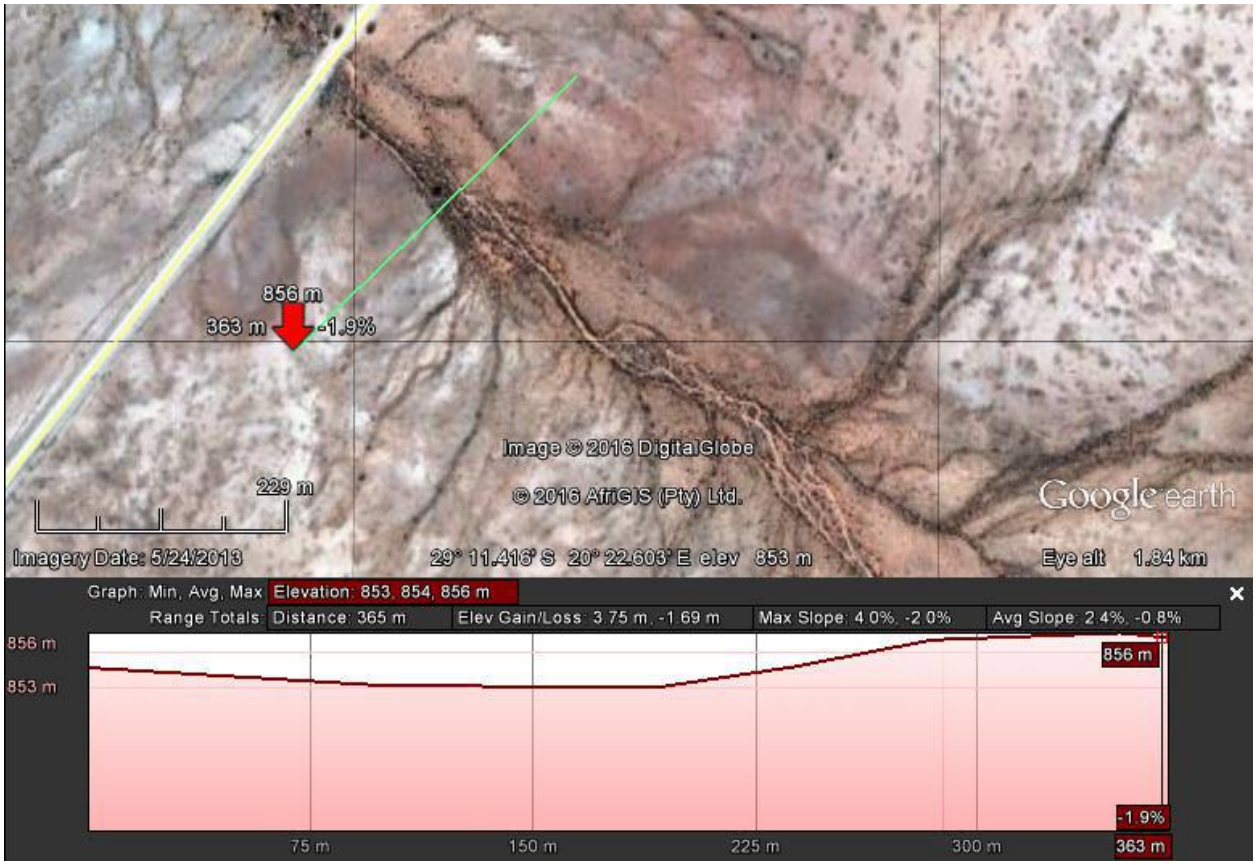
SLOPE PROFILE DRY STREAM 2(B):



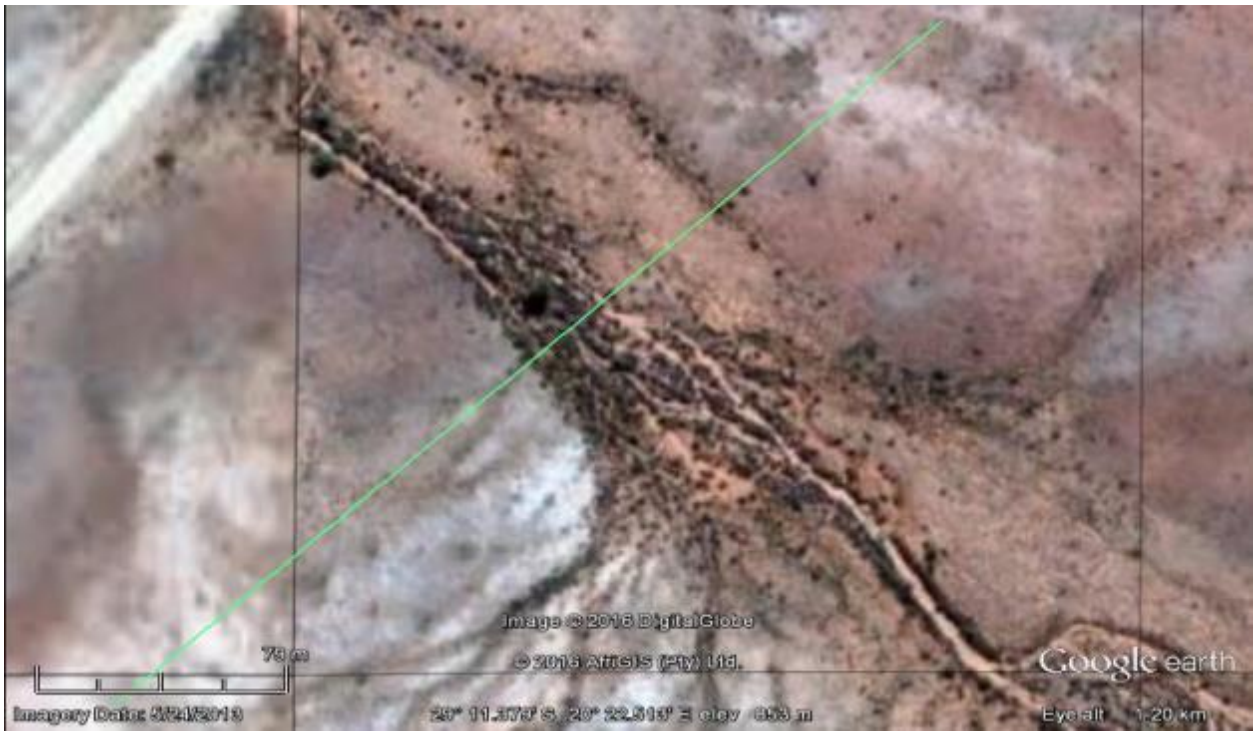
AVERAGE SLOPE: 0.8%, -1.8%



SLOPE PROFILE DRY STREAM 2(C):



AVERAGE SLOPE: 2.4%, -0.8%



Appendix A	Curriculum vitae (F.J.Erasmus)

CURRICULUM VITAE

PERSONAL DETAILS:

APPLICANT: FREDERIK JOHANNES ERASMUS (FRIK)

ID NO: 641031 5016084
MARITAL STATUS ; Married

Details of spouse:
Name: Margaretha Johanna Erasmus (Professional Social Worker)
Date of Birth: 1969-05-08

Dependants: Wife and 3 children
Nationality: South African citizen

OCCUPATION:

Research Scientist (Geographer), Teacher (Geography),
Principal Environmental Officer, Group Environmental Co-ordinator,
Environmental consultant (Environmental Management, etc.).

Address:

5 Bloem Street
Mierderpark
Potchefstroom
2531

Cell: 082 460 8934

E-mail: sumsar@worldonline.co.za

1) QUALIFICATIONS:

1	**ST.10 MATRIC CERTIFICATE** (Geography (HG), Biology (HG), Physical science(HG), Mathematics(HG), Afrikaans(HG), English (HG)).	1982	Dr. Malan Meyerton
2	**B.Sc** (Geography , Botany , Soil Science, Zoology, Chemistry, Statistics, etc.)	1985	P.U.for C.H.E
3	**Honn. B.Sc** ((Physical geography),Geomorphology, Hydro-geography, Climatology, Agricultural geography, etc.) Project: ***"Die verband tussen reënval in Januarie en Februarie en die Mielieproduksie in die Potchefstroomse Landrosdistrik."*** (Statistical analyses of climatic data versus maize production data for the magisterial district of Potchefstroom).	1986	P.U.for C.H.E
4	**M.Sc " The Geomorphology of a section of the Mega-Kalahari)** ABSTRACT: From this study it is clear that the Mega-Kalahari experienced various dry and wet climates in geological time. These variations in the climate manifest in the geomorphology, which is associated with a desert climate. The Mega-Kalahari also been influence by wet climate conditions, as is indicated by the presence of drainage features, such as rivers and pans. The Mega-Kalahari is the result of weathering, sedimentation and the redistribution of sand and alluvium in the Mega-Kalahari basin. It is clear from the study that the interpretation of Landsat imagery **(remote sensing using satellite imagery)** can be effectively used in geomorphological studies. It must, however, be supplemented by the use of small scale **aerial photography.**	1991	P.U.for C.H.E

5	**M.Sc (Environmental Management and Analyses)** ***(See Geography & Environmental studies)*** **Project:** **AN ENVIRONMENTAL MANAGEMENT SYSTEM FOR HIKING TRAILS IN THE GOLDEN GATE HIGHLAND NATIONAL PARK** (Physical field work, erosion studies, Compilation of ISO14000 Environmental Management System, Environmental management programme, Environmental legislation, Rehabilitation, Mapping, Technical drawings, statistical analyses, etc.)	1997	P.U.for C.H.E *(Now known as the NWU)*
	ABSTRACT: The type and extent of the physical deterioration (erosion) of the hiking trail/ rock type associations in the Golden Gate Highland National Park and the possible reasons for the deterioration are clear from the results of the empirical study. Erosion can be directly attributed to the influence of the hikers' walking action. The extent of erosion varies between different hiking trail/rock type associations. Through a correlation analysis between erosion values and certain topographical variables, ideal sampling points were identified and the results can be used as criteria for the future planning of hiking trails. Differences between the field and path measurements for plant nutrient status, textural composition and soil compaction, are clear evidence of the physical deterioration of the hiking trails that can be directly attributed to the influence of the hikers. Physical limitations experienced by the hikers can also contribute to the increase in the erosion of a particular trail section. Current measures to stop erosion are not adequate. Therefore certain suggestions are made. The installation of a permanent walking path segments could be a solution. **In** order to stop or mitigate any further deterioration of the hiking trails in the Golden Gate Highlands National Park and to prevent other negative environmental influences, an environmental management system has to be implemented by the Park management. The implementation of an environmental management system will ensure a balance between recreation and conservation.		

2) OTHER RELEVANT COURSES COMPLETED:

1	Short course in Environmental Management	P.U.for C.H.E (NWU)
2	Course in Water Quality Management in Industry and Mining	University of Pretoria
3	Using Satellite Imagery to get more from GIS	CSIR
4	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmenta l Management (NWU)

Note: Proof of certificates could be provided if requested.

3) PREVIOUS WORK EXPERIENCE:

1) Work as a student every university holiday	Municipality of Meyerton (*Working with the Mr. Everson (accountant) and Mr. J. Jacobs (internal auditor, etc.)*	1983-1986
2) Researcher	47 Terrain Evaluation Unit	1987-1988
3) Research Scientist (Geographer)	Dept. of Botany and Soil Science (P.U. for C.H.E). *(Dept. of Bodemkunde)_*	1989-1993
4) Teacher (Geography) (Grade 8-12)	Hoërskool Oosterland (Secunda) Temporary Geography post. Registered at the TED as a teacher.	Sept.-Des 1993
5) Principal Environmental Officer	Directorate Mine Rehabilitation (HQ in Pta) Northwest-Regional Office	1994-97 1997-2001
6) Group Environmental Co-ordinator	Durban Roodepoort Deep Ltd. (HQ).	2002 up to 2004.
7) Environmental Consultant/ specialist	*F.J.Erasmus trading as* Celtis Environmental Solutions	2005-current

Total: 29 years

4.1) Research Scientist	Dept. of Botany and Soil Science (P.U. for C.H.E).	1989-1993

PROJECTS:

- **Geomorphology of a section of the Mega Kalahari**
- (Remote sensing, Landsat imagery, classification of geomorhological landscape features, indicating relationship between current and paleo-climatic conditions, stabilization of dunes with vegetation, soil development, sand drift potential, aeolian and fluvial processes , active and paleo-dune fields, pans , rivers)

- Report on the **Geographical features of the Northern border** of Southern Africa.

- Compilation of a **terrain-geomorphological map of Namibia** (using Landsat satellite imagery and topographical maps.)

- Determination of the **erosion potential of various types of asbestos** by means of rainfall simulator study (for Prof. Kobus van der Walt, Dept. of Geography and Environmental studies).

- Determination of the **influence of vermiculite** with regard to run-off and infiltration on different types of soil (for the Institute for Reclamation Ecology).

- Determination of **nano-relief features on selected pre Karoo slopes** (with reference to possible application within **vehicle mobility studies** for Gerotek).

- **Comparative analyses of terrain roughness** and the classification of 2 rock types by using a terrain roughness wheel meter in conjunction with Gerotek.(for Mr. J.M. Hattingh, Dept. of Botany & Soil Science).

- Inputs with regard to slope analyses, drainage, geology, topography and climate within the Soil report for the Gutshwa study area in Kangwane.

- Field studies with a mobile rainfall simulator. Results presented as part of a poster presentation in conjunction with Dr. Koos Henning, titled:" The correlation between soil- and vegetation degradation in the semi-arid grasslands."

- Presenting practical classes with regard to **map reading and remote sensing.**

- Assisting during **soil surveys** (Mr. Koos Pauer, Dept of Botany and Soil science).

4.2) Principal Environmental Officer	Directorate Mine Rehabilitation (HQ in Pretoria) & Northwest-Regional Office, Sub-Directorate Mine Rehabilitation	1994-97 1997-2001

PROJECTS:

- Investigation with regard to the **Rehabilitation of Waste Rock Dumps** at the Palabora Mining Company.
- Investigation with regard to **alternative rehabilitation methods** in order to mitigate the dust problem at a slimes dam at the Prieska Copper mine.
- **Investigation towards environmental auditing and monitoring in the mining sector.**
- **Compilation of the Strategy on environmental auditing and monitoring for the mining sector.**
- Compilation of the **audit procedure guideline** for the mining sector.
- Investigation towards the need for **environmental management systems** within the mining sector.
- Comparative investigation with regard to **gold slimes dams, waste rock dumps and rehabilitation methods**.
- **Recommendation and development of an environmental course for DME officials. Compilation of the study plan.**
- Also involved in the development and presentation of **orientation course for environmental officers.**
- Compilation of the **standard EMP's** for prospecting, the dimension stone industry and waste rock crusher operations.
- Investigation with regard to Granite mines (rehabilitation, etc).
- Investigation towards **definitions** for environmental management and rehabilitation.
- Investigation towards **relevant legislation** with specific reference to the environment, **since 1893**.

- Investigation towards the establishment of an **environmental management information system.**
- Investigation towards the compilation of **guidelines with regard to environmental monitoring.**
- Investigation towards **alternative strategy** with regard to environmental management in the **small scale mining sector.**
- Investigation towards the **use of remote sensing as a important tool** with regard to **monitoring of gold slimes dams.**

DUTIES AS THE PRINCIPAL ENVIRONMENTAL OFFICER (NW REGIONAL OFFICE):

- **Handling of the EMP approval process (Minerals Act, 1991).**
- **Terrain visits and recommendations with regard to compilation of EMPR's for prospecting and mining activities.**
- **Inputs given with regard to EMPR's during State department consultation meetings with consultant and mining company.**
- **Evaluation and recommendations with regard to EMPR documents.**
- **Consultation with all relevant state departments , such as DWAF, NDA, DEAT, etc.**
- **Evaluation of financial provision for rehabilitation and implementation of the EMP (Part 6).**
- **Conducting various field investigations with regard to particular issues/complaints pertaining to environmental management, rehabilitation, pollution, etc. Compilation of reports with recommendations (corrective actions). ETC.**
- **Conducting regular inspections.**
- **Attending mine environmental management forum meetings.**

4.5) Group Environmental Co-ordinator	Durban Roodepoort Deep Ltd.	2002 up to 2004.

Duties as the ENVIRONMENTAL CO-ORDINATOR:

- Compilation of **ENVIRONMENTAL MANAGEMENT PROGRAMMES** (DRD NW OPERATIONS, Blyvooruitzicht addendum to the EMP with regard to reclamation of slimes dams and the expansion of an existing operational slimes dam. Liaison with authorities and consultant for specialist studies).
- **EMP Auditing (EMPPA) and inspections**
- Compilation of **strategy and guideline documents** with regard to **rehabilitation of gold slimes dams and opencast mining activities**.
- **Monitoring** of rehabilitation **contract work**.
- Determination of **rehabilitation project cost estimates**.
- Compilation of a **Strategy for waste management** at the Blyvooruitzicht mine.
- Various environmental investigations and recommendations.

4.6) Environmental consultant	Celtis Environmental Solutions	Since 2005 & Still active

Duties as a ENVIRONMENTAL CONSULTANT (CELTIS ENVIRONMENTAL SOLUTIONS):

- **Compilation of EIA/EMP's for various mines like :**
- Goldfields (Kloof,Libanon, Leeudoorn mine), Crown mines, Hemic Ferrochrome, Assore (Wonderstone, Rustenburg Minerals, Zeerust Chrome), etc.

- Kelgran granite , Xstrata Chrome and various prospecting activities for EES.

- Diamond mines, diamond prospecting activities, reclamation of slimes dams at Machavi mine, various sand mines, granite & marble mines for DERA) , etc.

- Compilation of EIA/EMP's for various diamond mines (Koppie-Alleen, etc.) , Middelvlei Gold prospecting operation, Project proposal for an integrated water management plan for Kao mine, etc. (for the CEM).

- Compilation of Scoping reports, EIA/EMP's for slimes dam operation at Rievly silica, and Witfontein slimes dam complex (Mintails) as part of the Fraser Alexander project team.

- Conducting various EMPPA audits, construction audits, etc., for Mine waste solutions, Crown mines, Hernic Ferrochrome, DERA, GCS, etc.

- Compilation of rehabilitation cost estimate reports on a annual basis for Crown, various diamond mines (DERA), etc.

- Compilation of closure documentation for various opencast mining operations at Samancor Buffelsfontein, Hemic Elandsfontein, Lafarge Lichtenburg, Crown (Fleurhofdam) reclamation operation, etc.

- Compilation of NEMA Basic Assesment reports for diesel tank facilities. Compilation of 24G reports for cattle feedlots.

- Compilation of the Golfields Kloof Mine Environmental Disaster Management Framework.

- Land use survey along the Leeuspruit, Kariegarivier(with special reference to water use)(for Goldfields Kloof mine).

- Land use survey along the Wonderfonteinspruit, Kraalkopspruit (with special reference to water use)(for Goldfields Driefontein mine).

- **Land use survey along the Theronspruit, Boschluisspruit (with special reference to water use)(for Goldfields Beatrix mine).**
- **Compilation of hazardous substances inventory. Environmental hazard classification and indicating specific handling requirements/operational procedures (for Driefontein mine).**
- **Conducting the GN704 audits (for the DWA) for ERGO operation.**
- **Conduction the Tlokwe Waste Landfill Permit Audit.**
- **Compilation of various NEMA BAR/EMP Reports for DERA for sand and granite operations.**
- **ETC.**

Note: Proof of projects/documents could be provided if requested.