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DRAFT BASIC ASSESSMENT REPORT

THE PROPOSED ESTABLISHMENT OF 19 HECTARES OF ROOIBOS CULTIVATION LANDS ON TWEERIVIERE, FARM 958/0, NIEUWOUDTVILLE

THE CLIENT

DEPARTMENT OF AGRICULTURE, RURAL DEVELOPMENT AND LAND REFORM: NORTHERN CAPE.

DATE

OCTOBER 2016

DENC Ref: NC/BA/22/NAM/HAM/NIE1/2016

FOOTPRINT Environmental Services offers Environmental Impact Assessments, Basic Assessments, Environmental Management, Environmental Control and Monitoring, Public Participation, Environmental Management Effectiveness Auditing, Environmental Planning

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	(For official use only)
File Reference Number:	(DENC REFERENCE NUMBER - NR NC/BA/22/NAM/HAM/NIE1/2016)
Application Number:	
Date Received:	

Basic Assessment Report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

- This basic assessment report is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
- This report format is current as of 08 December 2014. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
- The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
- Where applicable tick the boxes that are applicable in the report.
- An incomplete report may be returned to the applicant for revision.
- The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
- This report must be handed in at offices of the relevant competent authority as determined by each authority.
- No faxed or e-mailed reports will be accepted.
- The signature of the EAP on the report must be an original signature.
- The report must be compiled by an independent environmental assessment practitioner.
- Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
- A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
- Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES	NO
If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.		

1. ACTIVITY DESCRIPTION

a) Describe the project associated with the listed activities applied for

The landowner, Mrs Katrina Koopman wishes to expand her organic rooibos tea *(Aspalathus linearis*) production capacities with another 19hectares. The express aim is to addressing economies of scale and ensuring financial sustainability in a market that is characterized by significant volatility in price year on year. She is part of the Rooibos emerging farmers development Ilima Letsema project.

The landowner seeks permission to develop 19 hectares for Rooibos tea production which will entail the clearance of natural vegetation for the preparation of the production areas. Three areas have been identified and soil samples undertaken by BVI Consulting Engineers.

The Nieuwoudtville Plateau is recognized as one of the best Rooibos tea production areas within the natural distribution area of Rooibos. The demand and markets for organic Rooibos tea has been on a significant upward trend for decades but is characterised by price volatility. To deal with market volatility requires that a production concern is able to produce on a large enough scale to take advantage of the good years but also to be able to keep the business afloat on smaller profit margins by ensuring that enough volume is delivered to absorb losses of lower prices.

The primary driver of the upward trend in market size has been the significant growth in sophisticated international markets concerned with healthier and more responsible living. Rooibos has health benefits primarily due to the high levels of anti-oxidants which make it very popular in these types of markets. The product is sold in a bewilderingly varied number of products but the bulk of the produce is sold as fermented Rooibos, flavoured fermented tea and unfermented ("Green") Rooibos. The products is also sold in herbal blends, iced tea, skincare products and toiletries.

Rooibos is an endemic plant to the Fynbos Biome that includes the most northerly section of the Biome – the Nieuwoudtville Plateau in the Northern Cape. As the production will be based on organic conditions - there is no need for additional agricultural infrastructure by way of dams, soil drainage, irrigation and electricity systems etc.

b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 734, 735 and 736	Description of project activity
Listing Notice 1 (GN No. R. 983), specifically Activity 17 - The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-	*The size of the footprint for the development is 19 hectares and will require the clearing of natural vegetation to that extent.*

(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014.Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

In this instance Site Alternatives are not available as the farm is the only site on which the development can take place as it is the only property owned by the applicant.

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Locality 1: The farm Tweeriviere is located in the extreme south of the Nieuwoudtville Plateau the southern boundary of the property is along the Doring River which drains from east to west, see also APPENDIX A – Maps (Locality Map).	31° 53' 7.352" S	19° 08' 45.795" E

In the case of linear activities:

Alternative:	Latitude (S):	Longitude (E):
Alternative S1 (preferred)		
• Starting point of the activity	NOT APPLICABLE	NOT APPLICABLE
• Middle/Additional point of the activity	NOT APPLICABLE	NOT APPLICABLE
• End point of the activity	NOT APPLICABLE	NOT APPLICABLE

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

b) Lay-out alternatives

In this instance Layout Alternatives are not available as the areas identified by the proponent are the best possible areas for the production of Rooibos Tea on the property. The sites are primarily selected due to their soil, agricultural potential and land capability. These sites were sampled, tested and selected prior to this application to determine their agricultural suitability and potential see Appendix D – Specialist Reports. Three sites where suitable soil is present were selected, please refer to Appendix A - Maps (Site Plan)

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
Site 1: The site is located to the west of the farm buildings close to the western boundary of the farm Tweeriviere. This is the most westerly site and the smallest comprising an area of 3.39 ha's. The site is located on a plateau that slopes gently to the centre of the site from east to west and from west to east.	31° 53' 40.696" S	19° 07' 41.944" E
Site 2: The site is located to the west of the farm buildings close to the western boundary of the farm Tweeriviere. It is located 475 m to the north west of Site 1 (measures at the closest distance between them). This is the most northerly site and the second largest comprising an area of 7.45 ha's. The site is located on a plateau that slopes gently from south west to north east.	31° 53' 25.769" S	19° 08' 3.568" E
Site 3: The site is located to the west of the farm buildings close to the western boundary of the farm Tweeriviere. It is located 634 m to the south east of both site 1 & 2 (measures at the closest distance between them). This is the most southerly site and the largest comprising an area of 9.07 ha's. The site is located on a plateau that slopes gently from north to south.	31° 53' 54.857" S	19° 08' 21.173" E

c) Technology alternatives

Alternative 1 (preferred alternative)
This crop is grown with very few inputs in terms of chemicals and fertilisers and or other plant nutrients on dry land. The use of minimum till / conservation tillage is still in its research phase for this agricultural crop with no clear indication of its viability or benefit and as such recommendations in this regard would be premature. Another technological advance in the agricultural sector over the last number of years in South Africa has been the emergence of precision farming. However the expense associated with precision farming is prohibitively costly, in particular in this instance because by comparison to other intensive crops Rooibos is a low net earner that would not be able to support the costs associated a high technology input farming system such as this at this point.

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

Operational Alternatives

Alternative 1 (preferred alternative)
In an operational sense the farming system for the production of Rooibos is well established and tested over many years. Operationally disturbance would firstly be caused by vehicles accessing the site, during the preparation of the lands for planting, the harvesting of the crop and the transport of the crop to the processing area located on another property. Operational guidelines would therefore be associated with the management of these potential impacts and could adequately be addressed in an EMPr. The harvesting and processing of Rooibos occurs once a year and is dependent on temporary harvest labour to get the crop off the lands, a more mechanised approach to harvesting is unfeasible as an estimate of the amount that may be cut from individual Rooibos plants needs to be taken i.e. a pre set mechanical harvester is not possible as each plant will be cut at a different height depending on its own dimensions. Plants harvested to severely (cut too low to the ground) die off reducing the number of years that an individual plant remains productive, which in turn would have significant impacts on the yield per hectare and the economic viability of growing the crop. Currently producers are highly dependent on the advisory services that are housed within the agro-chemical industries in terms of recommendations for biocide and fertiliser use, to shift the farming operation away from this support service would require an effective and independent extension service from a statutory source. Currently this is wholly unfeasible due to a chronic lack of capacity within state institutions to fulfil this role. The emerging farmers industry on the South Bokkeveld (primarily producers contracted to the Heiveld Co-op.) is well supported through in-house industry extension and regulated in terms of the use of biocides (through international certification organisations) and therefore has to adhere to international requirements in terms of biocide use and maximum residue levels due to the fact that the product is exported, primarily to Europe in bulk for further processing. These are sophisticated markets that require high levels of traceability and product safety (as a producer of Heiveld co-op, the proponent is Organic Certified (EU, NOP and Natureland) and Fair Trade (FLO) accredited. Current operational practice allows for a number of years for a land to lie fallow after a crop is harvested to provide soils with the opportunity to rest and remain sustainably productive. This is good practice and well established within this sector. The combination of strip cultivation and the sowing of cover crops is also a well-established operational procedure to combat and protect soils from wind erosion.

Activity Alternatives

Alternative 1 (preferred alternative)
The mix of intensive and extensive use of the land does translate into the most practicable and economically sustainable landuse for this locality. In our evaluation the opportunity cost weighs in favour of the proposed development due to the conservation status of the ecosystem type and the distance from any important pattern or process biodiversity features and the ability to mitigate impact through the use of strip cultivation and buffering of more sensitive habitats – in this area drainage lines identified as buffer areas for the Doring River. The area is economically active due to its suitability for the cultivation of an indigenous plant that does not grow in any other part of the world. Sustainable landuse options for people in this location are limited to intensive and extensive agricultural pursuits and in our consultation appear to be closely linked to the ability of a producer to respond to the vagaries of the market place by ensuring that (1.) diversification of small stock and Rooibos production provides the most sustainable option in terms of an economic model for a farm, and (2.) that enough area needs to be made available to intensive production to ensure enough product volume is available to ride out market fluctuations and increase the amount of land available to use as productive grazing to bolster the small stock side of the business. Therefore on evaluation as an activity we believe it to be a feasible alternative.

e) No-go alternative

It must be noted here that the planning documentation identifies this portion of the landscape as suitable for intensive agricultural pursuits. Additionally that the locality is characterised in the conservation planning by a low regional impact on the ecosystem. This would perpetuate the current situation and would translate into the utilisation of the sites for extensive agricultural pursuits such as grazing by small stock. Fynbos ecosystems are characterised by the fact that they have very low nutrient status and are not able to support enough stock units per hectare to provide a sustainable livelihood. Moreover by lucky coincidence the more rocky areas do support relatively more palatable plants by comparison to deeper sandy soils, thus the mix of deeper more arable soils and rocky areas used for grazing are the most efficient means of utilising any given area for an economic pursuit. It must also be noted that disturbance within these vegetation types is essential for its health, in Fynbos by far the greatest source of necessary disturbance comes from fire which is essential for the rejuvenation of the ecosystem and to a lesser extent from the physical action of grazers hooves breaking up the soils surface and from the grazing on palatable shrubs and forbes. **To pursue the no go option is not considered feasible. From an economic perspective this landuse option is aligned with provincial and local forward planning - the mix of intensive and extensive use of the land does translate into the most economically sustainable landuse for this locality. The opportunity cost weighs in favour of the proposed development due to the conservation status of the ecosystem type and the extent of the development itself in relation to its impacts on biodiversity. The area is economically active due to its suitability for the cultivation of an indigenous plant that does not grow in any other part of the world. Sustainable landuse options for people in this location are limited to intensive and extensive agricultural pursuits and in our consultation appear to be closely linked to the ability of a producer to respond to the vagaries of the market place by ensuring that (1.) diversification of small stock and Rooibos production provides the most sustainable option in terms of an economic model for a farm in this region, and (2.) that enough area needs to be made available to intensive production to ensure enough product volume is available to ride out market fluctuations and increase the amount of land available to use as productive grazing to bolster the small stock side of the business.**

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:		Size of the activity:
Alternative A1 (preferred activity alternative)		199 100 m^2

or, for linear activities:

Alternative:		Length of the activity:
Alternative A1 (preferred activity alternative)	NOT APPLICABLE	NOT APPLICABLE

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:		Size of the site/servitude:
Alternative A1 (preferred activity alternative)		199 100 m^2

4. SITE ACCESS

Does ready access to the site exist?	YES	NO
If NO, what is the distance over which a new access road will be built	NOT APPLICABLE	

Describe the type of access road planned:

NOT APPLICABLE

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

5. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s;)
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and

- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

6. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

7. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

8. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

9. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

• Is the activity permitted in terms of the property's existing land use rights?	YES	NO	Please explain
Property is zoned for agriculture (Zonation Agriculture 1)			
• Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES	NO	Please explain

The PSDF states in the planning that efficient resource (capital) management. The efficient appropriation and use of the various forms of capital of the Northern Cape is imperative for the achievement of long-term sustainability and the vision set for the province as it relates to 'enhancing our future'. This is to be achieved through *inter alia* coherent local economic development, and efficient performance of economic sectors such as agriculture, mining, industry, science and technology, and tourism.

In terms of settlement patterns within the province the recent move to a global economy has been detrimental for many settlements because of the loss of manufacturing jobs, the vulnerability of export agriculture, and the increased competition in the energy and mining sectors. Securing better economic potential for producers such as this would therefore be aligned.

The agricultural sector contributed 5.8% to the Northern Cape GDP per region in 2007 which was approximately R1.3 billion, and it employs approximately 19.5% of the total formally employed individuals (LED Strategy). The sector is experiencing significant growth in value-added activities, including game-farming (PGDS, July 2011). Food production and processing for the local and export market is also growing significantly. The Rooibos Tea sector in line with this has similarly demonstrated market growth over time.

However agriculture is seen as a key component of the provincial GDP but is increasingly under pressure and its contribution has decreased steadily over time. Rejuvenation and support to this sector is required in the province. In the PSDF agriculture saw a decrease from 7.5% of GDP to 6.0% between 2008 and 2010. Increasing the production potential on farms through appropriate development would therefore contribute to the reversal of this trend.

Section C5 of the PSDF (Ensuring Sustainable Use of SPC : Agricultural Areas states as a clear objectives:

a) Develop the Northern Cape agricultural sector into a national and international asset.
b) Develop and utilise the comparative economic advantages vested in agriculture.
c) Protect high potential agricultural land from non-agricultural development.
d) Utilise agricultural land in terms of the principles of sustainable agriculture.
e) Utilise natural agricultural resources for the benefit of all (e.g. through partnerships).

To a greater or lesser extent the proposed development has elements of each of these stated objectives.

The Spatial Plan for Agriculture identifies the area as having intermediate suitability for arable agriculture. Thus the area is located in an area that is considered suitable for agricultural

production of this nature. The strategy flowing from this planning layer States the following:

C6.1.4(a) - Ensure that development scale and design are determined by the carrying capacity of the environment, including the following:

f) Potential of the site for sustainable agriculture or other productive land-use (i.e. the *instrumental* value of the site).

(b) Urban edge / Edge of Built environment for the area	YES	NO	Please explain
NOT APPLICABLE			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO	Please explain
Currently there is no Local Authority SDF available for the Hantam Municipality. In the IDP the Northern Cape Growth and Development Strategy reflects and opportunity for growth in the agriculture and agri-processing sectors. The IDP notes that agriculture forms the backbone of the local economy (contributing 11% to GDP) and the sector offers opportunities fro growth and employment. The project is registered n the IDP under section 6.3 – Facilitate economic development in the Hantam Municipal Area. In particular the Rooibos Tea : Emerging Farmers Development in Ward 4 as an ongoing project by the Department of Agriculture. This full alignment with the current IDP can be demonstrated.			
(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
None available for the Hantam Municipality.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO	Please explain
None available for the Hantam Municipality.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
Biodiversity Sector Plan for the Namakwa District Municipality - in terms of identifying critical biodiversity areas and recommended planning categories for the areas to be cleared in terms of this plan. Investigation of the area shows that the areas identified will overlap with Critical Biodiversity Areas. These will be further evaluated in the impact assessment and through the evaluation of alternatives. The desired management objective would be sustainable development			

and management within general landuse principles and constitute favoured areas for development.			
(g) Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES	NO	Please explain
As stated above the spatial planning for agriculture assigned t the area in the only available SDF – the PSDF states that the area is suitable for agricultural production. Currently there is no Local Authority SDF available for the Hantam Municipality. In the IDP the Northern Cape Growth and Development Strategy reflects and opportunity for growth in the agriculture and agri-processing sectors. The IDP notes that agriculture forms the backbone of the local economy (contributing 11% to GDP) and the sector offers opportunities fro growth and employment. The project is registered n the IDP under section 6.3 – Facilitate economic development in the Hantam Municipal Area. In particular the Rooibos Tea : Emerging Farmers Development in Ward 4 as an ongoing project by the Department of Agriculture.			
(h) Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES	NO	Please explain
As shown above job creation, is one of the clear challenges that the local authority faces in the years to come, due in part to natural population expansion of the resident population and with migrant people immigrating into the area seeking gainful employment and an income able to provide a sustainable livelihood. The towns close to the proposed development have low potential to develop both in terms of economic and social development e.g. Nieuwoudtville. Hence the status quo of agriculture being the mainstay for future employment from these centres will remain a long term reality. Towns such as these will be the source for low skilled labour that will move to the agricultural sector either as temporary labour or to find permanent employment. Additionally the agricultural industry is the one sector with the ability to absorb large numbers of unskilled labour that are otherwise for the most part unemployable. Through increase of the production volume possible from these properties have direct links to the provision of sustainable low skilled jobs. Finally it additionally will provide more financial security to the emerging farmers in the area though greater production volume potential and income generation for the owners of the property. The proposed development is fully aligned with the strategic forward planning for the area and is appropriate and fully aligned with the current landuse practice on site.			

(i) Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES	NO	Please explain
The proposed development does not require the provision of any additional services from the municipality.			
(j) Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	YES	NO	Please explain
NOT APPLICABLE – This is not an infrastructure project being contemplated by the Hantam Municipality.			
(k) Is this project part of a national programme to address an issue of national concern or importance?	YES	NO	Please explain
The establishment and support to emerging farmers is a national priority. This is supported through the National Strategy for Sustainable Development under the Goal: Implement skills development, in particular the youth, in the green economy sector, with the interventions in: • Agriculture, food production and forestry • Supporting programmes to ensure the protection of agricultural land, sustained food security and local economic development The proposed development is additionally addressed under **Strategic Infrastructure Investment 11 – Agri-logistics and rural infrastructure**. This strategic investment seeks to improvement investment in agricultural and rural infrastructure that supports expansion in production and employment, small scale farming and rural development.			
(l) Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES	NO	Please explain
The locality has a well established history of being a successful Rooibos tea production area, due to			

its particular climate and the suitability of its soils for the production of this agricultural product, Rooibos. The proposed development is characteristic of the surrounding landuse.			
(m) Is the development the best practicable environmental option for this land/site?	YES	NO	Please explain
In this case yes. The opportunity cost favouring the establishment of an expanded organic certified Rooibos production system is in an area where the SPC for the ecosystems allow for the proposed development and landuse, low to negligible impacts locally to regionally and the low carrying capacity of the ecosystem type that could provide a sustainable livelihood from small stock farming alone. Taking these considerations into account it would appear that the proposed development is the most practicable environmental option. Furthermore this landuse has shown success over many years in this situation where sustainable livelihoods are not possible from extensive agriculture alone.			
(n) Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES	NO	Please explain
The primary environmental impact of this development is associated with the loss of biodiversity due to the clearance of natural vegetation. This is however mitigated in two ways; firstly the development is located in an area where the landuse option is compatible with the SPC's for the preservation of biodiversity pattern and process. Moreover currently the vegetation type is regarded as Least Threatened but according to the Botanical Specialist has been incorrectly mapped and should be regarded as Vulnerable and Secondly the Rooibos production system, lends itself to the retention of biodiversity pattern and process due to the strip cultivation practice that is followed as a matter of course i.e. cleared strips being alternated with retained strips of natural vegetation that serve as wind break, act as safe refuge for species and allowing movement of biota. To this could be added the low chemical inputs required to successfully produce a crop of Rooibos. On the opportunity side we should consider the development and support to emerging farmers, more secure business and job opportunity. The opportunity in this instance therefore does appear to outweigh the environmental cost.			
(o) Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO	Please explain
This is the most prevalent landuse in the area and is therefore common agricultural practice throughout the Nieuwoudtville Plateau.			
(p) Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO	Please explain
This is a development on a landowners property by the Department of Agriculture on behalf of that landowner with their full consent.			
(q) Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO	Please explain
NOT APPLICABLE – The development is located in a rural agricultural area well away from the			

nearest town of Nieuwoudtville.			
(r) Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO	Please explain
This is not an infrastructure project.			
(s) What will the benefits be to society in general and to the local communities?			Please explain
Providing for a more sustainable economic business, job opportunities to difficult to employ low skilled labour from towns with low potential for economic development, strengthening the local economy a key strategic sector for growth and development in the local authority, promoting the use of indigenous vegetation in economic activities, providing a healthy products to local and export markets that requires few if any chemical inputs in its production, retaining in field biodiversity through strip cultivation practices and through that preventing unnatural soil loss through erosion, retaining the current sense of place in that it is located in an area that people associate with the production of this crop as exemplified by the landuse character of the surrounding properties.			
(t) Any other need and desirability considerations related to the proposed activity?			Please explain
NONE			
(u) How does the project fit into the National Development Plan for 2030?			Please explain

The NDP 2030 calls for faster and more inclusive economic growth. In particular transforming the economy and creating sustainable expansion for job creation means that the rate of economic growth needs to exceed 5 percent a year on average.

To bring this about it proposes to increasing exports, focusing on those areas where South Africa already has endowments and comparative advantage, such as mining, construction, mid-skill manufacturing, **agriculture** and agro-processing, higher education, tourism and business services.

The apartheid system forced much of the African population into barren rural reserves. The result was an advanced and diversified commercial farming sector relying on poorly paid farm labour, and impoverished, densely populated communities with limited economic opportunities and minimal government services. To change this, the NDP 2030 proposes a multifaceted approach one of which is directly aligned to the proposed project:

- Creating more jobs through agricultural development, based on effective land reform and the growth of irrigated agriculture and land production.

Finally is Chapter 5: Environmental Sustainability and Resilience the stated objective of the NDP is:

- Increased investment in new agricultural technologies, research and the development of adaptation strategies for the protection of rural livelihoods and expansion of commercial agriculture.

(v) Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

1. to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities.

This is addressed through the provision of an Environmental Management Programme (EMPr) with this Basic Assessment Report where the roles and responsibilities of the applicant and the Environmental Control Officer (ECO) are articulated in detail to ensure that the development of the Rooibos production areas happens in an integrated and well managed fashion.

2 (a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;

Ensuring that the recommendations for mitigation of environmental impact contained within this report under Section F adhere to the principles of a precautionary approach that aims first to avoid environmental impact and secondly where impacts are unavoidable to mitigate environmental impact for an activity that will have significant impact on the environment. To consider the opportunity cost in proceeding with the development above. Furthermore that these mitigatory measures are made practicably implementable in the EMPr and monitored to ensure compliance. Finally to recognise in the recommendations supplied that the environment is interlinked and to give adequate consideration to these linkages and how they proposed development may impact over the short term but also cumulatively over the long term.

(b) identify, predict and evaluate the actual and potential impact on the environment, socioeconomic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;

The identification of potential impacts is contained under Section F of this report. The evaluation of the identified impact follows a process of predicting the actual or potential impact in terms of sustainability criteria for each of the alternatives being considered. Thereafter the impact is quantified is terms of its severity in the absence of any mitigatory measures to avoid an impact, mitigation measures are then proposed that would or could reduce the impacts to within acceptable levels, in instances where environmental impacts cannot be suitably mitigated to weigh the opportunity costs of proceeding against those of the potential benefit to people and the economy, to evaluate the linkages that exist between identified impact and determine if these linkages have the potential to amplify impact through synergies that may exist between them and after this process always follow the option that delivers the best possible benefit for the least possible impact. In instances where the cost significantly outweighs the opportunity to consider a recommendation for not proceeding with the proposed development.

(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;

This is addressed through the process of identifying and evaluating environmental impacts either individually or through complimentary associations that may amplify the severity of impacts. Proposing mitigatory measures and translating those mitigatory measures into practically implementable actions within an EMPr.

(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;

To follow the guidelines for public participation in accordance with the requirements of NEMA legislation, to honour and reflect all reasonable objections raised by key stakeholders and other interested and affected parties, to propose solutions to address those concerns and present them for further comment in the BAR. To resolve all reasonable objections as a matter of process.

(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and

This is addressed through the provision of an EMPr that must be implemented as part of the operational and maintenance phase of the development.

(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.

This is addressed through the provision of an EMPr that must be implemented as part of the operational and maintenance phase of the development.

(w) Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

Section 2 of NEMA is addressed through the involvement of all key government stakeholders in the public participation process to allow time and opportunity for them to adequately comment on a proposal and act on their mandate to respect, promote and protect peoples social, developmental, physical, cultural and economic rights. The requirement is further addressed through the engagement with I&AP's as part of the public participation process, and the provision of an opportunity for all I&AP's the provide input into the assessment process and respond to all reasonable comments on an individual basis. Responses and decisions made must and do take cognisance of the individual concerns of I&AP's. Adherence to these principles are addressed through the execution of the Guidelines on Public Participation circulated by DEA&DP in August 2010. Consultation and consideration of the planning documentation of the DEA&DP, CapeNature, SANBI and the Local Authorities are also included to address this principle.

As this assessment rests on the three tenets of sustainability adequate consideration is given to the interaction between the environment that forms the basis for the delivery of goods and services to the economic sector which in turn delivers social benefit and livelihoods to people. In particular that the process of assessment attempts first to avoid negative environmental impact (including pollution, disturbance to the landscape, impacts on cultural heritage, the generation of waste and its disposal) and if impacts are unavoidable to mitigate these impacts or remedied. Here the assessment would make use of the guideline on needs and desirability of the proposed

development to assess the cost/benefit equation for the proposed development and through the evaluation of the different alternatives available to the proponent and through this process the determination of the best possible practically implementable alternative.

The assessment will also address the type of resources being used whether renewable or non-renewable and assess the resource availability in terms of equitable distribution of resource allocation or to ensure that every effort is made to ensure that the demand on the resource does not exceed its ability to regenerate, as is the case with ecologically based environmental goods and services. In particular investigate the conservation status of the particular ecosystem or special habitat that may be impacted by the development by investigating the National Spatial Biodiversity Assessment, Biodiversity Sector Plan for the local authority, Fine-scale Conservation Plans and the listed ecosystems in Government Notice 1477 of 2009. Here also consideration is given to the DEA&DP Guideline on Alternatives for Aug 2010. To ensure that a precautionary approach is followed at all times with due consideration to knowledge gaps and assumptions that are made in relation to the proposed development. In instances where impacts are anticipated to ensure that these are mitigated or remedied to a point that they do not infringe on basic human rights.

Furthermore this section of NEMA is addressed through the provision of an EMPr that aims to provide an integrated environmental management programme that recognises the linkages between environmental elements and puts forward the most applicable and practically reasonable means to achieve the objectives of the EMPr. In particular the EMPr must ensure environmental health and safety, not only to the broader community but also to workers involved in the execution of the activity to ensure that their rights are not ignored. As and where necessary include environmental education to skill those responsible for the implementation of the EMPr to undertake the required training to fully dispense with their responsibility in terms of requirements of the EMPr. The assessment addresses issues that extend well beyond the borders of the property concerned to ensure that environmental impacts resulting from a development are not disproportionately felt by a person while always ensuring that equitable access to environmental resources to meet basic human needs is ensured for all persons.

11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	**Applicability to the project**	**Administering authority**	**Date**
The Constitution of the Republic of South Africa (Act 108 of 1996)	(S2) Bill of Rights (S24) Environmental rights - the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and		

	other measures that – prevent pollution and ecological degradation;		
The National Environmental Management Act (NEMA) (Act 107 of 1998)	Environmental Impact Assessment (EIA) Regulations have been promulgated in terms of Chapter 5 of the Act. Everyone wishing to undertake an activity listed in these EIA Regulations (GN 385. 386 & 387 of 2006) needs an environmental authorization. S24(1) of the Act stipulates that the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority. According to S28(1) – the Duty of Care Provision – the project proponent must ensure that reasonable measures are in place to ensure that pollution and or degradation of the environment are avoided, stopped and or minimised. This is applicable for the entire life cycle of the proposed solar energy facility.	Department of Environmental Affairs	Act 107 of 1998
The National Environmental Management : Biodiversity Act (Act 10 of 2004)	In terms of S 56(1) a list of threatened &protected species has been published in Government Gazette 29657; Additionally to this; GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007),	Department of Environmental Affairs	Act 10 of 2004

	GN R 151 (list of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or protected Species Regulations) has been published. Under this Act, a permit must be required for any activity which may negatively impact on the survival of a listed protected species.		
Environmental Conservation Act (Act 73 of 1989)	National Noise Control Regulations (GN R154 – 10th January 1992)	Department of Environmental Affairs, NC Department of Environment and Nature Conservation as well as the Local Authorities	Act 73 of 1989
National Water Act No 36 of 1998	S19 – Duty of Care that stipulate that the project proponent must ensure that reasonable measures are in place to prevent and mitigate to effect of pollution of water resources. S20 – describe the procedures to follow in a emergency impact that may impact on a water resource. S21 – Definition of water use. S22 – Any water use that is not Schedule 1 as stipulated in terms of this Section must be authorised. S151 - unlawfully and intentionally or negligently commit any act or omission which detrimentally affects or is likely to affect a water resource.". A "water resource include "a water course, surface water, estuary or aquifer".	Department of Water Affairs	Act 36 of 1998
National Heritage Resources	S38 - Stipulate that any	South African Heritage	Act 25 of

Act (Act No 25 of 1999)	person who intends to undertake a development such as-(*a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; (b) the construction of a bridge or similar structure exceeding 50m in length; any development or other activity which will change the character of a site-* must at the very earliest stages of initiating such a development inform the local resource authority of such development.	Resource Agency	1999
Conservation of Agricultural Resources Act (Act 43 of 1983)	Regulation 15 has been promulgated that makes it unlawful to allow various species of weeds and invader plants to grow.	Department of Agriculture	Act 43 of 1983
National Veld and Forest Fires Act (Act 101 of 1998)	In terms of S12 a landowner must ensure that there is a firebreak around the property that is long and wide enough to have a reasonable chance of stopping a fire from spreading, not cause erosion and be free of inflammable materials. S17 requires the landowner to have sufficient equipment, protective clothing and trained personnel to extinguish fires	Department of Agriculture, Forestry and Fisheries (DAFF)	Act 101 of 1998
Development Facilitation Act (Act 67 of 1995)	Overall framework and required administrative structures for planning in South Africa.	Local Municipality	Act 67 of 1995

Subdivision of Agricultural Land Act)Act 70 of 1970)	Land subdivision requirements and procedures.	Department of Agriculture, Forestry and Fisheries (DAFF)	Act 70 of 1970
Northern Cape Nature Conservation Act (Act 9 of 2009)	The sustainable utilisation of wild animals, aquatic biota and plants, provides for the implementation of the Convention for the trade in endangered species of Wild fauna and Flora, offences and penalties in terms of the act, the appointment of nature conservators and the issuing of permits	Department of Environment and Nature Conservation.	

POLICY/ GUIDELINES	ADMINISTERING AUTHORITY
Guidelines on Public Participation	DEA
Guideline Needs and Desirability	DEA
Guideline on Transitional Arrangements	DEA
Guideline on Alternatives	DEA
Guidelines on Resorts	DEA
Northern Cape PSDF	DENC
Integrated Development Plan, 2015-2016	Hantam Municipality
CAPE Fine-scale Conservation Plans	DENC / SANBI
South African Vegetation Map	SANBI
Biodiversity Sector Plan – Namakwa District Municipality	Namakwa DM
Rooibos Biodiversity Initiative – Best Practices	SARC – South African Rooibos Council

12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES	NO
If YES, what estimated quantity will be produced per month?		m^3

How will the construction solid waste be disposed of (describe)?

NOT APPLICABLE

Where will the construction solid waste be disposed of (describe)?

NOT APPLICABLE

Will the activity produce solid waste during its operational phase?	YES	NO
If YES, what estimated quantity will be produced per month?		m^3
How will the solid waste be disposed of (describe)?		

NOT APPLICABLE

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

NOT APPLICABLE

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

NOT APPLICABLE

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?	YES	NO

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	NO

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	NO
If YES, what estimated quantity will be produced per month?		**NOT APPLICABLE**
Will the activity produce any effluent that will be treated and/or disposed of on site?	YES	NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO

If YES, provide the particulars of the facility:

Facility name:	**NOT APPLICABLE**		
Contact person:	**NOT APPLICABLE**		
Postal address:	**NOT APPLICABLE**		
Postal code:	**NOT APPLICABLE**		
Telephone:	**NOT APPLICABLE**	Cell:	**NOT APPLICABLE**
E-mail:	**NOT APPLICABLE**	Fax:	**NOT APPLICABLE**

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

NOT APPLICABLE - This is a dry land agricultural system that is rain fed thus no reuse or recycling

of waste water.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	YES	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO
If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.		
If NO, describe the emissions in terms of type and concentration:		
NOT APPLICABLE		

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?	YES	NO

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?	YES	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO
Describe the noise in terms of type and level:		
General noise associated with the production of an agricultural crop, machinery such as tractors to prepare the lands for planting of the crop and to transport the harvested crop to the tea lanes for drying and packaging for the export market.		

13. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	**NOT APPLICABLE**
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	YES / NO
If YES, please provide proof that the application has been submitted to the Department of Water Affairs.	

14. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

NOT APPLICABLE

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

NOT APPLICABLE

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):	

- Paragraphs 1 - 6 below must be completed for each alternative.

• Has a specialist been consulted to assist with the completion of this section?	YES	NO
If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.		

Property description/physical address:	Province	Northern Cape Province
	District Municipality	Namakwa District Municipality
	Local Municipality	Hantam Municipality
	Ward Number(s)	4
	Farm name and number	Two Rivers, Farm 958
	Portion number	0
	SG Code	C01500000000095800000
	Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.	
Current land-use zoning as per local municipality IDP/records:	Agriculture 1	
	In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.	

Is a change of land-use or a consent use application required?	YES	NO

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Preferred Site Alternative (Please refer to the Appendix A – Maps (Site Plan)

S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

S2:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

S3:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

S1, S2 and S3:

2.1 Ridgeline		2.4 Closed valley		2.7 Undulating plain / low hills	
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		2.6 Plain		2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	S1:		S2:		S3:	
Shallow water table (less than 1.5m deep)	YES	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO	YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO	YES	NO	YES	NO

An area sensitive to erosion	YES	**NO**	YES	**NO**	YES	**NO**

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

S1, S2 and S3:

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River	YES	**NO**	UNSURE
Non-Perennial River	YES	**NO**	UNSURE
Permanent Wetland	YES	**NO**	UNSURE
Seasonal Wetland	YES	**NO**	UNSURE
Artificial Wetland	YES	**NO**	UNSURE
Estuarine / Lagoonal wetland	YES	**NO**	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

NONE

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

S1, S2 and S3:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential[A]	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant[A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, koppie or ridge
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam[A]	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how this impact will / be impacted upon by the proposed activity? Specify and explain:

NONE

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

NONE

If any of the boxes marked with an "[H]" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

NONE

Does the proposed site (including any alternative sites) fall within any of the following:

S1, S2 and S3:

Critical Biodiversity Area (as per provincial conservation plan) – *Ecological Support Area, Namakwa District Municipality Terrestrial Migration Corridor*	YES	NO
Core area of a protected area?	YES	NO
Buffer area of a protected area?	YES	NO
Planned expansion area of an existing protected area?	YES	NO
Existing offset area associated with a previous Environmental Authorisation?	YES	NO
Buffer area of the SKA?	YES	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	NO
	Uncertain	
NONE – Please refer to Appendix D – Specialist Reports (Heritage)		

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:
This was undertaken by a Heritage Practitioner – the outcome was that the site has no significant heritage resources on site. Please refer to Appendix D – Specialist Reports (Heritage).

Will any building or structure older than 60 years be affected in any way?	YES	NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	NO
If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.		

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

In the absence of any SDF for the Municipality we consulted the PSDF. Here it was reflected that unemployment in the Northern Cape presents a major challenge as indicated by the estimates obtained of the LED Strategy and PGDS (July 2011). The unemployed level in the Northern Cape is lower than the national average but the not economically-active population is higher than the average for South Africa. Pixley ka Seme has the highest unemployment rate (21.6%) in the province followed by Frances Baard at 19.19%. Namakwa in which this project is located has the lowest unemployed rate (13.4%). The Hantam Municipality IDP states that unemployment and poverty affects a large number of people within the municipal area. The unemployment rate for the youth is 15, 3% according to the 2011 census. Of the 7 085 economically active people in the municipal area, 11, 8 % are unemployed.

Economic profile of local municipality:

The largest contributor to the GDP of the Hantam Municipality is Finance and Business Services

sector contributing 23.1% to GDP, this if followed by the Government, contributing 18.4% to the local economy. The other important sectors in the local economy include Community, Social and Personal Services at 11.4%, Agriculture at 11.0%, Transport, Storage and Communications at 10.8% and the Retail Sector with 9.9% of GDP. The balance is comprised of Mining, Manufacturing, Electricity & Gas and Construction.

Level of education:

The following table indicates the adult education levels of citizens residing in the Hantam Local Municipality: Education	2015 (% of Total)
Grade 0	2.85
Grade 1/Sub A	2.99
Grade 2/Sub B	2.89
Grade 3/Std 1/ABET 1 Kha Ri Gude; Sanli	3.8
Grade 4/Std 2	4.12
Grade 5/Std 3/ ABET 2	4.65
Grade 6/Std 4	5.72
Grade 7/Std 5/ ABET 3	7.12
Grade 8/Std 6/ Form 1	9.08
Grade 9/Std 7/Form 2/ ABET 4	6.04
Grade 10/Std 8/ Form 8	6.9
Grade11/ Std 9/ Form 4	3.35
Grade 12/ Std 10/ Form 5	12.48
NTCI/N1/NIC/ V Level 2	0.01
NTC II/N2/NIC/ V Level 3	0.08
NTC III/N3/ NIC/ V Level 4	0.07
N4/ NTC4	0.11
N5/NTC 5	0.08
N6/NTC6	0.18
Certificate with less than Grade 12/Std 10	0.08
Diploma with less than Grade 12/ Std 10	0.08
Certificate with Grade 12/Std 10	0.54
Diploma with Grade 12/Std 10	1.6
Higher Diploma	0.95
Post Higher Diploma Masters, Doctoral Diploma	0.17
Bachelor Degree	0.67
Bachelor Degree and Post Graduate Diploma	0.24
Honours degree	0.22
Higher Degree Masters/PhD	0.11
Other	0.11
No schooling	10.14
Not applicable	12.56
Grant Total	100

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	

What is the expected yearly income that will be generated by or as a result of the activity?	R 200 000.00	
Will the activity contribute to service infrastructure?	YES	NO
Is the activity a public amenity?	YES	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	No new employment opportunities	
What is the expected value of the employment opportunities during the development and construction phase?	N/A	
What percentage of this will accrue to previously disadvantaged individuals?	100%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	This is a PDI farmer who owns the property.	
What is the expected current value of the employment opportunities during the first 10 years?	R 30 000.00	
What percentage of this will accrue to previously disadvantaged individuals?	100%	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

Systematic Biodiversity Planning Category				If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	CBA identified for ecological connectivity with the recommended landuse that is aligned to the retention of the natural functioning of the ecosystem.

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries,

	up to 100%)	grazing, harvesting regimes etc).
Natural	100%	The sites are all located in pristine natural vegetation.
Near Natural (includes areas with low to moderate level of alien invasive plants)	0%	
Degraded (includes areas heavily invaded by alien plants)	0%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	0%	

c) Complete the table to indicate:
   (i) the type of vegetation, including its ecosystem status, present on the site; and
   (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems						
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical Endangered Vulnerable Least Threatened	Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
		YES	NO	UNSURE	YES	NO	YES	NO

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

According the SA Vegetation Map the property falls within a single vegetation unit Doringrivier Quartzite Karoo. However a Specialist Botanist was appointed to ascertain if any Species of Conservation Concern were present on the property and during this assessment it was noted that the vegetation unit has been incorrectly mapped. The correct vegetation unit is Nardouw Sandstone Fynbos which in its latest assessment is considered to be Vulnerable due to the extensive conversion of this vegetation type to Rooibos Tea within its area of distribution, please refer to Appendix D – Specialist Reports (Botanical).

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Ons Kontrei	
Date published		
Site notice position	Latitude	Longitude
Date placed		

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Ward Councillor	The ward councillor - Nieuwoudtville	Private bag X 14, Calvinia, 8190
Mr J Kotze	Neighbour	P.O.Box 148 Clanwilliam, 8135
Mr D Koopman	Neighbour	Po Box 47. Nieuwoudtville, 8180
The CEO	Heiveld Co-operative Ltd	PO Box 154; Nieuwoudtville, 8180
The CEO	Environmental Monitoring Group	

- Please note that all the landlines are down because of line theft without any cellular network available postal contacts is the only communication method in the South Bokkeveld.

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP

4. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Group	Organisation / Department	Title	Initials	Surname	Postal	Town	Code	Contact number
Authorities	Hantam Municipality	The Municipal Manager			Private bag X 14	Calvinia	8190	municipalmanager@hantam.gov.za
Authorities	Hantam Municipality	The ward councillor - Nieuwoudtville			Private bag X 14	Calvinia	8190	municipalmanager@hantam.gov.za
Authorities	Namakwa District Municipality	The Municipal Manager			PO Box 20	Springbok	8240	info@namakwa-dm.gov.za
Authorities	Department of Agriculture	Mr	L	October	PO Box 18	Springbok	8240	loctober@ncpg.gov.za
Authorities	Department of Water and sanitation	Mr	A	Abrahams	28 Central Road, Beaconsfield	Kimberley	8301	AbrahamsA@dwa.gov.za or Abe@dwa.gov.za
Authorities	Department of Environmental Affairs and Nature Conservation		Onwabile	Ndzumo	Private Bag X 16	Springbok	8240	onyndzumo@gmail.com
Authorities	DAFF-Landuse		Rahab	Maboa	Private Bag X2,	Sanlamhof	7532	RahabM@daff.gov.za

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

For the full impact assessment please refer to Appendix F – Impact Assessment

Impacts that may result from the planning, design and construction phase

Activity	Impact summary	Significance	Proposed mitigation
Alternative 1 (preferred alternative)			
Geographical & physical impacts	*Direct impacts:*	Low	Avoid unsuitable areas or areas with steep slopes. Establish post harvest cover crops
	Indirect impacts:	Low	Retain the natural structure, composition and pH of the soils.
	Cumulative impacts:	Low	Retain the natural structure, composition and pH of the soils.
Biological Impacts	*Direct impacts:*	Medium -Low	Ensure that only demarcated areas are cleared. Ensure that ecological connectivity is retained. If practical strip cultivation should be followed.
	Indirect impacts:	Low	Ensure that only developed areas are disturbed, ensure that natural areas remain connected across the

			landscape and across gradients. Vehicles must remain on designated access roads and not deviate. Small stock should be managed to avoid trampling and / or overgrazing of areas adjacent to the developed area. Use fire selectively and in consultation with the Greater Cederberg Fire Protection Association. Control and suppress wildfire accidentally or purposefully ignited.
	Cumulative impacts:	Low	Vehicles must remain on designated access roads and not deviate. Small stock should be managed to avoid trampling and / or overgrazing of areas adjacent to the developed area. Use fire selectively and in consultation with the Greater Cederberg Fire Protection Association. Control and suppress wildfire accidentally or purposefully ignited.
Socio-economic impacts	*Direct impacts:*	Low	Ensure the appointment of local labour for the clearing and development of the Rooibos production areas.
	Indirect impacts:	Low	Ensure the appointment of local labour for the clearing and development of the Rooibos production areas.
	Cumulative impacts:	Medium	Ensure the appointment of local labour for the clearing and development of the Rooibos production areas.
Cultural & historical Impacts	*Direct impacts:*	None	No cultural resources are evident on these sites
	Indirect impacts:	None	No cultural resources are evident on these sites
	Cumulative impacts:	None	No cultural resources are evident on these sites
Noise Impacts	*Direct impacts:*	Low	None required
	Indirect impacts:	None	None required
	Cumulative impacts:	None	None required

Visual Impacts	*Direct impacts:*	Low	None required as the development is additive but not contrary to the sense of place and existing landuse activity. Best practice would dictate that direct impact could be mitigated by selecting areas in low lining areas i.e. using topography to mitigate impacts
	Indirect impacts:	NONE	
	Cumulative impacts:	Low	None required as the development is additive but not contrary to the sense of place and existing landuse activity.
No-go option			
	Direct impacts:	None	None
	Indirect impacts:	Medium	The inability of the applicant to expand the business to a point where it is economically feasible and a commercial success.
	Cumulative impacts:	Medium to High	Cumulatively this would translate into a situation where the community would remain as a subsistence farming community with greater risk of total impoverishment with the net social impacts associated with a poor subsistence existence.

Impacts that may result from the operational phase.

Activity	Impact summary	Significance	Proposed mitigation
Alternative 1 (preferred alternative)			
Geographical & Physical	*Direct impacts:*	Low	Where practical practice strip cultivation. Establish post harvest crops to retain soils and prevent erosion.
	Indirect impacts:	Low	Use fertilisers judicially to ensure that the soil retains its natural character suitable for Rooibos, thus retaining natural fertility and suitability for

			recolonisation.
	Cumulative impacts:	Low	Retain the natural soil chemistry.
Biological Impacts	*Direct impacts:*	Medium to Low	Ensure that activities remain within the designated developed area to avoid trampling and degradation of vegetation adjacent to the production area and along access routes. Ensure the active avoidance of accidental fires.
	Indirect impacts:	Low	Ensure that corridors and strips are maintained to retain ecological functioning.
	Cumulative impacts:	Low	Ensure that activities remain within the designated developed area to avoid trampling and degradation of vegetation adjacent to the production area and along access routes. Avoid short interval fire returns from accidental fires.
Socio-economic impacts	*Direct impacts:*	Medium	Positive impact thus mitigation not required.
	Indirect impacts:	Medium	Increased economic viability of the farming operation and opportunities that would flow the family, children and descendants derived from greater income and the choices that income would bring.
	Cumulative impacts:	Medium	Greater opportunity directly to family members. Through increased income future generations have more options for advanced learning and income generation.
Cultural & historical impacts	*Direct impacts:*	None	No cultural resources are evident on these sites
	Indirect impacts:	None	No cultural resources are evident on these sites
	Cumulative impacts:	None	No cultural resources are evident on these sites
Noise	*Direct impacts:*	Low	None required as the site is remote and noise associated with an accepted landuse

	Indirect impacts:	None	None
	Cumulative impacts:	None	None
Visual Impacts	*Direct impacts:*	Low	None possible as the development will already be in situ.
	Indirect impacts:	Low	None possible as the development will already be in situ.
	Cumulative impacts:	Low	None possible as the development will already be in situ.

Impacts that may result from the decommissioning and closure phase

Activity	Impact summary	Significance	Proposed mitigation
Alternative 1 (preferred alternative)			
Geographical and physical	*Direct impacts:*	Low	Restore and rehabilitate the development footprint.
	Indirect impacts:	Low	Mitigation would be a product of the success of the rehabilitation effort and the re-establishment of the natural functioning and species diversity of the previously developed site.
	Cumulative impacts:	Medium	For a situation where large numbers of farmers were no longer able to farm in the area large tracts would return to their natural state thus restoring ecological functioning and species diversity over large areas and stabilising loss of soils to normal background levels of loss.
Biological impacts	*Direct impacts:*	Low	Ensure restoration efforts re-establish indigenous vegetation unit characteristic of the adjacent ecosystems.
	Indirect impacts:	Low	Mitigation would be a product of the success of the rehabilitation effort and the re-establishment of the natural functioning and species diversity of the previously developed site.
	Cumulative impacts:	Medium	For a situation where large

			numbers of farmers were no longer able to farm in the area large tracts would return to their natural state thus restoring ecological functioning and species diversity over large areas.
Socio-economic impacts	*Direct impacts:*	Low	None possible
	Indirect impacts:	Low	None possible
	Cumulative impacts:	Medium	Through the consolidation of the market, environmental best practice for the production system, effective and well capacitated extension to farmers, best practice in terms of employment and social standards for labour on farms.
Cultural & historical impacts	*Direct impacts:*	NONE	NONE
	Indirect impacts:	NONE	NONE
	Cumulative impacts:	NONE	NONE
Visual impacts	*Direct impacts:*	NONE	NONE
	Indirect impacts:	NONE	NONE
	Cumulative impacts:	NONE	NONE

In this instance the no go option is considered unfeasible because:

It must be noted here that the planning documentation identifies this portion of the landscape as suitable for intensive agricultural pursuits. Additionally that the locality is characterised in the conservation planning by a low regional impact on the ecosystem. This would perpetuate the current situation and would translate into the utilisation of the sites for extensive agricultural pursuits such as grazing by small stock. Fynbos ecosystems are characterised by the fact that they have very low nutrient status and are not able to support enough stock units per hectare to provide a sustainable livelihood. Moreover by lucky coincidence the more rocky areas do support relatively more palatable plants by comparison to deeper sandy soils, thus the mix of deeper more arable soils and rocky areas used for grazing are the most efficient means of utilising any given area for an economic pursuit. It must also be noted that disturbance within these vegetation types is essential for its health, in Fynbos by far the greatest source of necessary disturbance comes from fire which is essential for the rejuvenation of the ecosystem and to a lesser extent from the physical action of grazers hooves breaking up the soils surface and from the grazing on palatable shrubs and forbes.

To pursue the no go option is not considered feasible. From an economic perspective this landuse option is aligned with provincial and local forward planning - the mix of intensive and extensive use of the land does translate into the most economically sustainable landuse for this locality. The opportunity cost weighs in favour of the proposed development due to the conservation status of the ecosystem type and the extent of the development itself in relation to its impacts on biodiversity. The area is economically active due to its suitability for the cultivation of an indigenous plant that does not grow in any other part of the world. Sustainable landuse options for people in this location are limited to intensive and extensive agricultural pursuits and in our consultation appear to be closely linked to the ability of a producer to respond to the vagaries of the market place by ensuring that (1.) diversification of small stock and Rooibos production provides the most sustainable option in terms of an economic model for a farm in this region, and (2.) that enough area needs to be made available to intensive production to ensure enough product volume is available to ride out market fluctuations and increase the amount of land available to use as productive grazing to bolster the small stock side of the business.

A complete impact assessment in terms of Regulation 19(3) of GN 733 has been included as Appendix F – Impact Assessment.

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Impacts that may result from the planning, design and construction phase

Impacts of geophysical: Limited to the potential impacts on soils of the area and the alteration of soil chemistry, well mitigated due to the nature and production practices followed by the industry.

Impacts on Biological: For the actual vegetation removed the impact is permanent loss, however the production practice of strip cultivation together with the nature of the crop and good management practice and adherence to layout criteria could retain the plant, vertebrate and invertebrate communities and the diversity of the present day.

Socio-economic Impacts: Overall the expansion of the development footprint is seen as positive due to the actual creation of employment opportunities and more subtly through the strengthening of the business as a whole making it more resilient to market fluctuations.

Cultural Heritage Impacts: None are expected as no evidence of cultural or heritage resources were found on site.

Noise Impacts: Low levels of noise that are in any event associated with the broader agriculturally

based community in our estimation this is a negligible impact.

Visual Impacts: The levels of visual impact are significant but are aligned to the general look of the surrounding landscape which is almost exclusively used for Rooibos and small stock production systems.

Overall in our evaluation the impacts are low and reversible and the opportunity in terms of net benefit to securing an agricultural business and the associated opportunities for employment weigh more heavily in favour of the development in this well conserved ecosystem that is little threatened at this point in time.

Impacts that may result from the operational phase

Impacts of geophysical: Limited to the impacts on soils chemistry.

Impacts on Biological: Limited to edge effect impact on remaining vegetation both in-field, along access roads and along the field borders. The possible negative impacts during the operational phase are minimized through the adherence to specific guidelines by accreditation systems and protocols.

Increased fire risk. In our assessment these impact could be well managed through the implementation of management guidelines aimed at reducing edge effect impacts and reducing the potential for uncontrolled fires. Ongoing control and management of staff in field would be the most effective means to this end and by joining the Greater Cederberg Fire Protection Association.

Socio-economic Impacts: Overall the expansion of the development footprint is seen as positive due to the actual creation of employment opportunities and more subtly through the strengthening of the business as a whole making it more resilient to market fluctuations.

Cultural Heritage Impacts: None are expected as no evidence of cultural or heritage resources were found on site.

Noise Impacts: Low levels of noise that are in any event associated with the broader agriculturally based community in our estimation this is a negligible impact.

Visual Impacts: The levels of visual impact are significant but are aligned to the general look of the surrounding landscape which is almost exclusively used for Rooibos and small stock production systems.

Overall in our evaluation the impacts are low and reversible and the opportunity in terms of net benefit to securing a sustainable agricultural business and the associated opportunities for employment weigh more heavily in favour of the development in this well conserved ecosystem that is little threatened at this point in time. Moreover for future operational success the market signals for this sector look positive for the future.

Impacts that may result from the decommissioning and closure

Impacts of geophysical: Positive through the re-establishment of natural soil related cycles.

Impacts on Biological: Positive through the re-establishment and rehabilitation of previously disturbed

areas

Socio-economic Impacts: Negative through the loss of employment opportunity, in particular the rural unskilled poor, potential migration of these poor to other centres of potential employment.

Cultural Heritage Impacts: NONE

Noise Impacts: N/A

Visual Impacts: N/A

In the event that the site needs to be decommissioned and in our estimation resilience of the natural system is built into the proposed development through the well established practice of strip cultivation and the nature of the indigenous and locally adapted crop.

No-go Alternative

It must be noted here that the planning documentation identifies this portion of the landscape as suitable for intensive agricultural pursuits. Additionally that the locality is characterised in the conservation planning by a low regional impact on the ecosystem. This would perpetuate the current situation and would translate into the utilisation of the sites for extensive agricultural pursuits such as grazing by small stock. Fynbos ecosystems are characterised by the fact that they have very low nutrient status and are not able to support enough stock units per hectare to provide a sustainable livelihood. Moreover by lucky coincidence the more rocky areas do support relatively more palatable plants by comparison to deeper sandy soils, thus the mix of deeper more arable soils and rocky areas used for grazing are the most efficient means of utilising any given area for an economic pursuit. It must also be noted that disturbance within these vegetation types is essential for its health, in Fynbos by far the greatest source of necessary disturbance comes from fire which is essential for the rejuvenation of the ecosystem and to a lesser extent from the physical action of grazers hooves breaking up the soils surface and from the grazing on palatable shrubs and forbes. To pursue the no go option is not considered feasible. From an economic perspective this landuse option is aligned with provincial and local forward planning - the mix of intensive and extensive use of the land does translate into the most economically sustainable landuse for this locality. The opportunity cost weighs in favour of the proposed development due to the conservation status of the ecosystem type and the extent of the development itself in relation to its impacts on biodiversity. The area is economically active due to its suitability for the cultivation of an indigenous plant that does not grow in any other part of the world. Sustainable landuse options for people in this location are limited to intensive and extensive agricultural pursuits and in our consultation appear to be closely linked to the ability of a producer to respond to the vagaries of the market place by ensuring that (1.) diversification of small stock and Rooibos production provides the most sustainable option in terms of an economic model for a farm in this region, and (2.) that enough area needs to be made available to intensive production to ensure enough product volume is available to ride out market fluctuations and increase the amount of land available to use as productive grazing to bolster the small stock side of the business.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES	NO

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

It is recommended that the proponent adhere to industry standards in terms of biocide use, withholding periods, minimum residue limits, fertiliser use if any etc. for which there is extension support and controls and monitoring systems in place within the industry itself.

1. Areas selected on the property (Sites 1, 2 & 3) are the most suitable site alternatives and should be the areas cleared for the proposed development.
2. The final production areas should take cognisance of shallow and rocky areas or shale derived soils and these should be left intact.
3. Slopes above a 20 degree gradient should be avoided i.e. development should be located on flat to gently undulating areas. It must be noted though that these soils are not prone to erosion due to the unstructured and highly permeable sand.
4. Each cleared strip should be surveyed with a hand held GPS and the area calculated to ensure that the required threshold is not overstepped. This approach is required due to the fact that it is very difficult to estimate the amount of productive soil within the mosaic of small scale slopes, shallow soils and rock within the site.
5. The strips of natural vegetation between production rows must be >10m wide in line with industry best practices if practical and feasible in this instance.
6. An Environmental Management Programme for the Development and operational phase should be prepared to ensure that effective guidelines are provided to mitigate environmental impact through appropriate management intervention and all the conditions of this plan must be adhered to.
7. If not already a member of the Greater Cederberg Fire Protection Association the proponent should be instructed to join this organisation.
8. An appropriately qualified Environmental Control Officer should be appointed by the proponent to ensure that the conditions of the EMPr are fulfilled and that regular monitoring of the development is undertaken.
9. That the appointed ECO provide a final report to DEA&DP on completion of the activity to report on adherence to the conditions of the Record of Decision.

Is an EMPr attached?	YES	NO

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

_____
NAME OF EAP

_____ _____
SIGNATURE OF EAP DATE

SECTION F: APPENDIXES

The following appendixes must be attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

APPENDIX A - MAPS

Locality Map - Tweerviere, Farm 958 Restant

BRANDKOP
HANTAM
NIEUWOUDTVILLE
GROOTDRIF
CALVINIA
Arterial Route - R27
Arterial Route - R27
VANRHYNSDORP
Main Road - 364
Farm Tweeriviere
GPS Co-ordinates
19 08' 27.200"E
31 53' 13.244"S
DORINGBOS

Legend

- TOWNS

Roads

- <all other values>

FEAT_TYPE

- ARTERIAL ROUTE
- MAIN ROAD
- NATIONAL ROUTE
- OTHER ACCESS
- SECONDARY ROAD
- STREET
- TRACK FOOTPATH
- Twerrivier_Property_Boundary

FOOTPRINT Environmental Services

0 4.5 9 18 27 36 Kilometers

N W E S

Tweeriviere - Terrestrial & Aquatic Ecosystem Sensitivity Map

Terrestrial.

Tweerivier has been categorised as CBA 2 over the full extent of the property. The Land Management Objective for this category is identified as - the maintenance of near natural landscapes with some loss of ecosystem integrity and functioning.

Aquatic

The aquatic ESA should be managed to maintian a near natural landscape with minimal loss of integrity and functioning.

FOOTPRINT Environmental Services

0 0.375 0.75 1.5 2.25 3 Kilometers

Property Boundary

Cadastral Boundaries

Ecological Support Area - Aquatic

CBA 2 - Terrestrail

Other Areas

N

W E

S

APPENDIX B - Photographs

Tweeriviere
Photo Site Map

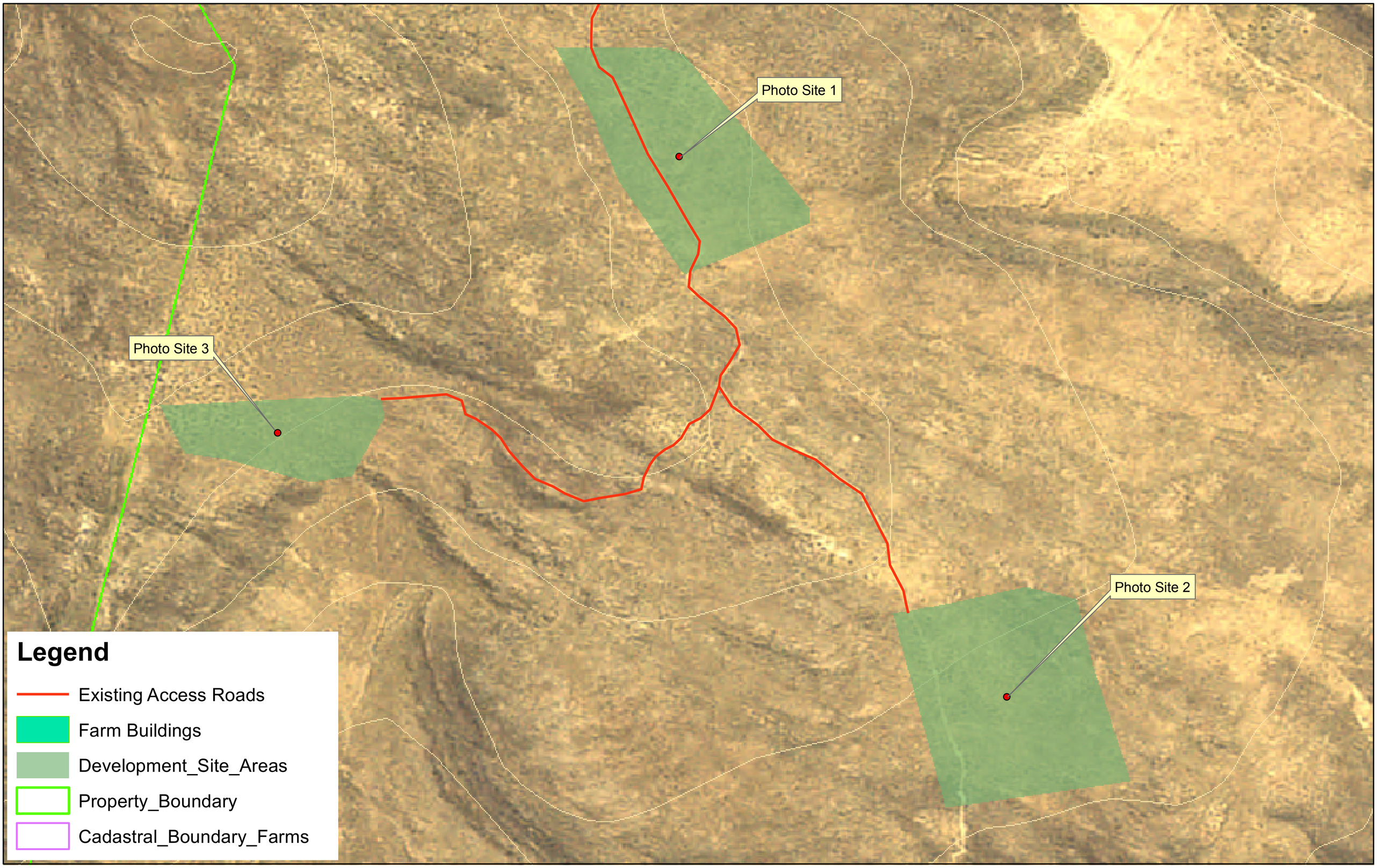
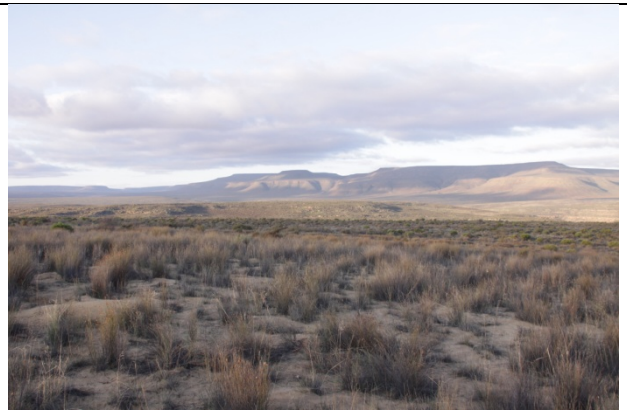


Photo Site 1



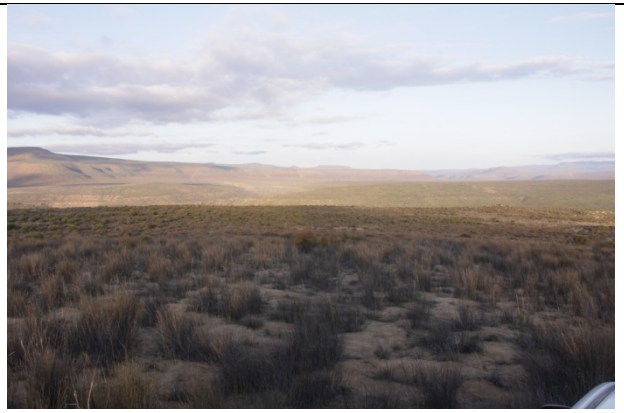
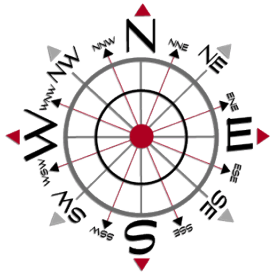


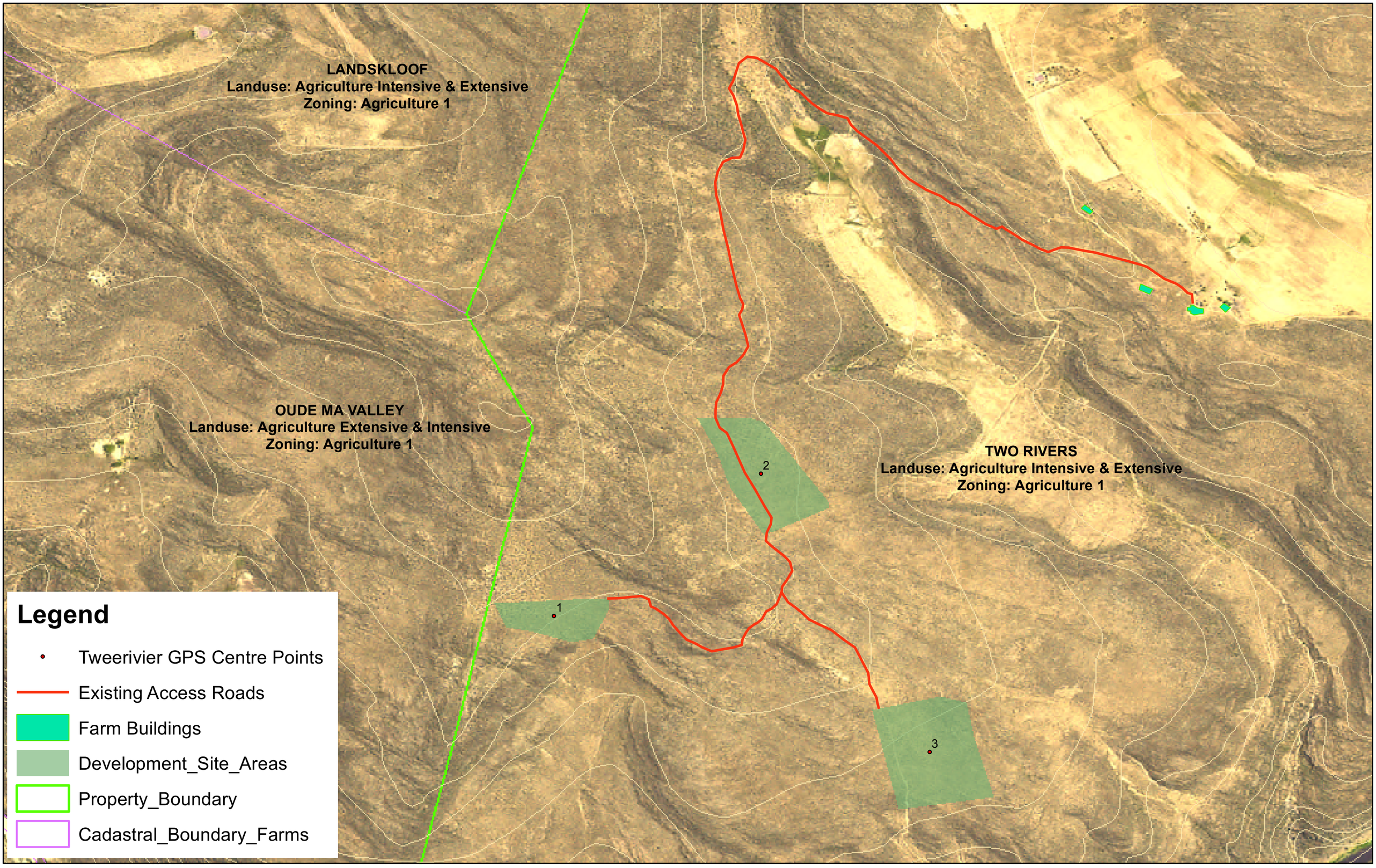
Photo Site 2

Photo Site 3



APPENDIX C – Facility Illustration

Tweeriviere
Site Map & Neighbouring Properties



FOOTPRINT Environmental Services

0 150 300 600 900 1 200 Meters

N W E S

APPENDIX D – Specialists Reports

HERITAGE IMPACT ASSESSMENT

PROPOSED CULTIVATION OF ROOIBOS TEA
FARM 958 TWEERIVIERE, NEAR NIEUWOUDTVILLE
HANTAM MUNICIPALITY, NORTHERN CAPE

Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

Prepared for

FOOTPRINT ENVIRONMENTAL SERVICES
Att: Mr Charl du Plessis
PO Box 454, Porterville, 6910
E-mail: charlduplessis2@afrihost.co.za

On behalf of:

MRS K. KOOPMAN
PO Box 219, Nieuwoudtville, 8180

By

ACRM
5 Stuart Road, Rondebosch, 7700
Ph/Fax: 021 685 7589
Mobile: 082 321 0172
E-mail: acrm@wcaccess.co.za

SEPTEMBER
2016

EXECUTIVE SUMMARY

1. Introduction

ACRM was instructed by Footprint Environmental Services to conduct a Heritage Impact Assessment (HIA) for the proposed cultivation of 18.8ha of new Rooibos tea fields on Farm 958 Tweeriviere (Hantam Municipality), near Niewoudtville in the Northern Cape.

The proposed fields are located on deep sandy soils on a flattish plateau between 1.0 and 1.6 kms east of the Dooring River and about 60 kms south of Nieuwoudtville. Access to the farm is via Moedveloer, a gravel road that eventually connects with the R364 to Calvinia / Clanwilliam.

The establishment of new Rooibos tea fields entails the clearance of natural vegetation by brush cutting. 10m wide strips of natural vegetation are retained between cultivated fields to serve as a refuge for beneficial insects and to provide wind beaks to prevent erosion. Cleared vegetation will either be removed from the fields and ploughed back into the soils, or moved to adjacent fields where it will decompose naturally.

2. Aim of the HIA

The overall purpose of the HIA is to assess the sensitivity of archaeological resources in the proposed development area, to determine the potential impacts on such resources, and to avoid and/or minimise such impacts by means of management and/or mitigation measures.

According to consulting palaeontologist, Dr John Almond, the proposed development site / Farm 958 is underlain by fluvial sandstones of the Rietvlei Formation (uppermost Table Mountain Group) `that are of low palaeontological sensitivity'.

3. Results of the HIA

A site assessment was undertaken on the 31 August 2016, in which the following observations were made:

One chalcedony flake and one quartz flake of *low* (Grade 3C) significance was recorded in the proposed new fields.

4. Conclusion

The proposed activity will not impact on significant archaeological heritage.

Indications are that, in terms of archaeological heritage, the proposed new fields are not a sensitive landscape.

The impact significance of the proposed development on important archaeological heritage is therefore assessed as LOW.

5. Recommendations

1. No archaeological mitigation is required prior to development activities commencing.

2. If any other unmarked human remains, or ostrich eggshell caches, for example, are exposed or uncovered during excavations these must immediately be reported to Heritage Western Cape (Att: Ms Natasha Higgit 021 462 4509), or the contracted archaeologist (Jonathan Kaplan 082 321 0172).

3. The above recommendations must be incorporated into the Environmental Management Plan (EMP) for the proposed development.

Table of Contents

1. INTRODUCTION

ACRM was instructed by Footprint Environmental Services, on behalf of Ms K Koopman to conduct a Heritage Impact Assessment (HIA) for the proposed cultivation of new Rooibos tea fields on Farm 958 Tweeriviere (Hantam Municipality) near Nieuwoudtville in the Northern Cape (Figures 1 & 2).

The proposed new fields are located on deep sandy soils on a flattish plateau between 1.0 and 1.6kms east of the Dooring River and about 60kms south of Nieuwoudtville. Access to the farm is via Moedveloer, a gravel road that eventually connects with the R364 to Calvinia/Clanwilliam.

The applicant intends to expand the current Rooibos tea production potential on Farm 958 by developing an additional 18.8 ha of new fields.

Footprint Environmental Consultants is the appointed independent Environmental Assessment Practitioner (EAP) responsible for facilitating the assessment process.

2. THE DEVELOPMENT PROPOSAL

Three new Rooibos tea fields (A, B & C) are planned, of which Field A (7 ha) and Field B (8.6ha) are the largest (Figure 3). The establishment of the new fields entails the clearance of natural vegetation by brush cutting. 10m wide strips of natural vegetation are retained between cultivated areas to serve as a refuge for beneficial insects and to provide wind beaks to prevent erosion. Cleared vegetation will either ploughed in the new fields, or moved to adjacent fields where it will decompose naturally.

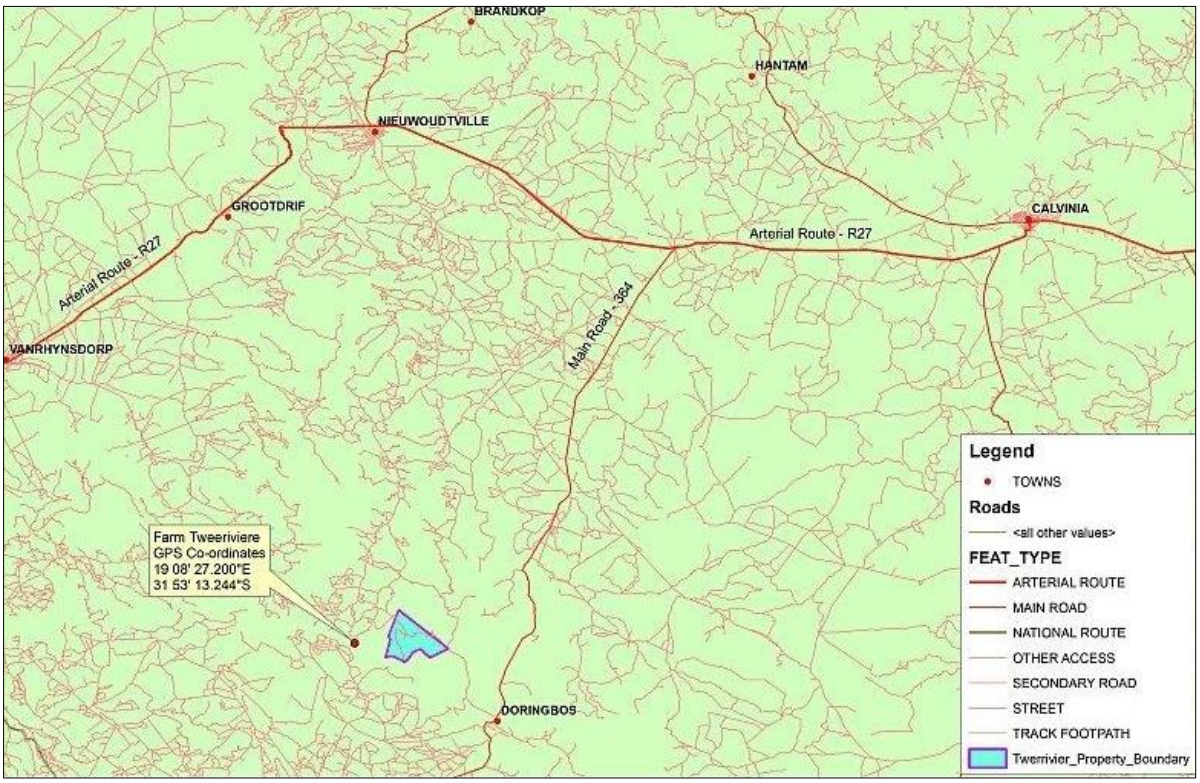


Figure 1. Locality map, Farm 958 Tweeriviere.

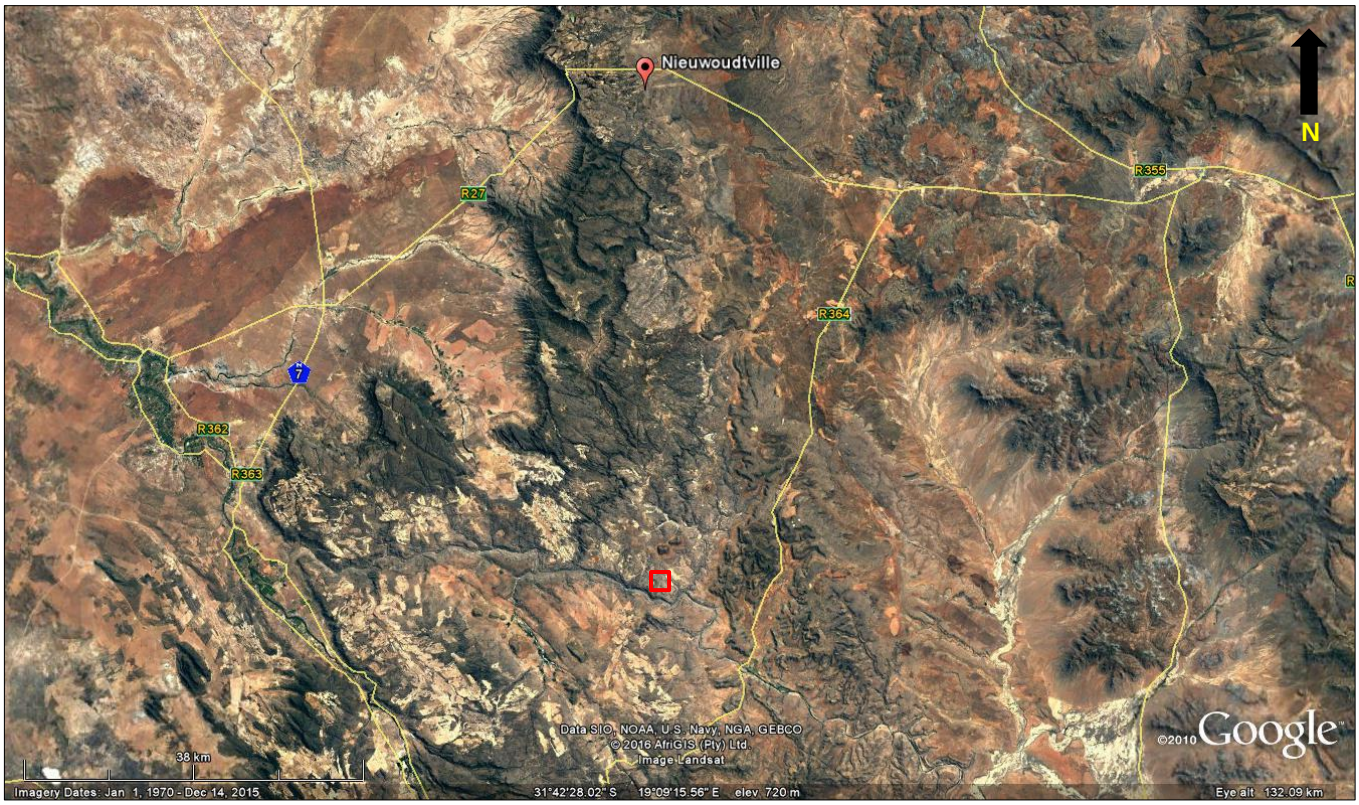


Figure 2. Google map indicating the location of the proposed new Rooibos tea fields on Farm 958, Nieuwoudtville. Red polygon indicates the location of the study site in relation to Nieuwoudtville.

Figure 3. Proposed layout of new Rooibos tea fields (A, B & C) on Farm 958 Tweerivier

3. HERITAGE LEGISLATION

The National Heritage Resources Act (NHRA No. 25 of 1999) protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, battlefield sites and buildings, structures and features over 60 years old. The South African Heritage Resources Agency (SAHRA) administers this legislation nationally, with Heritage Resources Agencies acting at provincial level. According to the Act (Sect. 35), it is an offence to destroy, damage, excavate, alter of remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit issued by the SAHRA or applicable Provincial Heritage Resources Agency, *viz*. Heritage Western Cape (HWC).

Notification of SAHRA is required for proposed developments exceeding certain dimensions (Sect. 38), upon which they will decide whether or not the development must be assessed for heritage impacts (an HIA) that may include an assessment of archaeological (a AIA) or palaeontological heritage (a PIA).

4. TERMS OF REFERENCE

The terms of reference for the study were to:

- Determine whether there are likely to be any important archaeological resources that may be impacted by the proposed development;

- Indicate any constraints that would need to be taken into account in considering the development proposal;

- Identify possible `No-Go` areas, and

- Recommend mitigation action

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

Tweeriviere is located about 60kms south of Niewoudtville. The farm is accessed via the Moedveloer road, which eventually connects with the R364 to Calvinia / Clanwilliam. The proposed fields are located on deep, light-yellow coloured sandy soils on a flattish plateau between 1.0 and 1.6 kms east of the Dooring River. A limited amount of tea is currently grown on the farm, including the cultivation of oats for grazing. Fields A and B slope eastward facing the Hantam Mountains, while Field C slopes to the south overlooking the Dooring River. All three fields are covered in a mix of Restio, grasses and shrubs, with open patches of sandy soils. There are some large Protea, trees in Field B and Leucadendron on the lower slopes in Field C. There are no significant landscape features on the proposed new fields, although shallow outcroppings of sandstone occur alongside the eastern boundary of Field B, while a larger outcropping of stone occurs on the steeper south facing slopes in Field C, outside the proposed footprint area (Figures 4-12). There is very little surface stone covering the affected landholdings. Surrounding land use comprises Rooibos tea, oats/feed and vast tracts of vacant agricultural land.

Figure 4. Proposed new Rooibos tea fields (Field A), Farm 958. View facing south

Figure 5. Proposed new Rooibos tea fields (Field A), Farm 958. View facing south west

Figure 6. Proposed new Rooibos tea fields (A), Farm 958. View facing north

Figure 7. Proposed new Rooibos tea fields (B), Farm 958. View facing north

Figure 8. Proposed new Rooibos tea fields (B), Farm 958. View facing south

Figure 9. Proposed new Rooibos tea fields (B), Farm 958. View facing north west

Figure 10. Proposed new Rooibos tea fields (C), Farm 958. View facing north

Figure 11. Proposed new Rooibos tea fields (C), Farm 958. View facing north

Figure 12. Proposed new Rooibos tea fields (B), Farm 958. View facing north west

6. STUDY APPROACH

6.1 Method

The purpose of the HIA is to assess the sensitivity of archaeological resources in the study area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures

The significance of archaeological resources was assessed in terms of their content and context. Attributes considered in determining significance include artefact and/or ecofact types, rarity of finds, exceptional items, organic preservation, potential for future research, density of finds and the context in which archaeological traces occur.

The field assessment was undertaken by ACRM on 30th August 2016. The position of identified archaeological resources, were plotted using a hand held GPS unit set on the map datum wgs 84. A track path of the survey was also captured.

A literature survey was carried out to assess the heritage context surrounding the proposed development site.

According to consulting palaeontologist, Dr John Almond (email correspondence dated 21 November 2015), the proposed development site / Farm 958 `is underlain by fluvial sandstones of the Rietvlei Formation (uppermost Table Mountain Group) that are of low palaeontological sensitivity'.

6.2 Constraints and limitations

While vegetation cover was sometimes quite thick on the ground, there were no constraints or limitations associated with the study. Mobility over the proposed development site was fairly easy.

6.3 Identification of potential risks

The results of the study indicate there are no archaeological risks associated with the proposed development.

7. ARCHAEOLOGICAL HERITAGE

In terms of archaeological heritage, the Nieuwoudtville area has not been very well documented, although one or two selective surveys have been undertaken. A few studies are listed on the SAHRIS website but these do not have any bearing on the current study. Numerous surveys have been undertaken near Loeriesfontein by this archaeologist and others, but the town is located more than 50kms north of the town.

A large number of rock art sites, including a few small artefact scatters occur at the Oorlogskloof Nature Reserve (Webley & Orton 2012, & personnel observation) a few kilometers outside Niewoudtville just before one enters the village, while rock art sites also occur on the Farms Paapkuilsfontein and Sewefontein about 25kms south of the village (personnel observation). Dispersed scatters of Later Stone Age tools, and isolated Middle Stone Age implements have also been found by this archaeologist at Sewefontein.

Hollmann (1993) did a survey of rock paintings in the Koebee River Valley, a tributary of the Doorn River, located to the south of Oorlogskloof, near Niewoudtville, while Humphreys *et al* (1991) have described rock art sites to the east of the Koebee River. At Oorlogskloof, Hollmann (1993) describes paintings of eland hartebeest, fat-tailed sheep scratches, palettes and handprints. Amschwand (2009) describes stone walling in the Onder Bokkeveld "which may indicate the presence of pastoralists", as well as pottery and rock art considered to be of Khoekhoen origin.

According to Webley and Orton (2012), Khoisan presence in the `Onder Bokkeveld' in the 1720s and 1730s discouraged early colonial settlement. In 1739 a Boer commando attacked Captain Jantje Klipheuwel"s farm in the Bokkeveld. At least 13 Khoisan were killed during this raid. The place was subsequently named "Oorlogskloof" – a name it retains to this day. The commando continued to scour the Bokkeveld for any further kraals. A kraal was later attacked near Doorn River and 17 Khoisan were killed. These tactics eventually put an end to an independent Khoisan existence in the Bokkeveld. The trekboers later moved into the Onder Bokkeveld and by 1770s the Bokkeveld was completely settled by white colonists (Webley & Orton 2012; Penn 2005).

8. FINDINGS

One chalcedony flake (Site 710 GPS reading 31°53'28.71"S 19° 7'57.41"E) and one quartz flake (Site 712 GPS reading 31°53'29.69"S 19° 8'3.81"E), was located in Field A, while no archaeological heritage was encountered in Fields B and C (Figure 13).

Grading of the archaeological resources: *low* (Grade 3C)

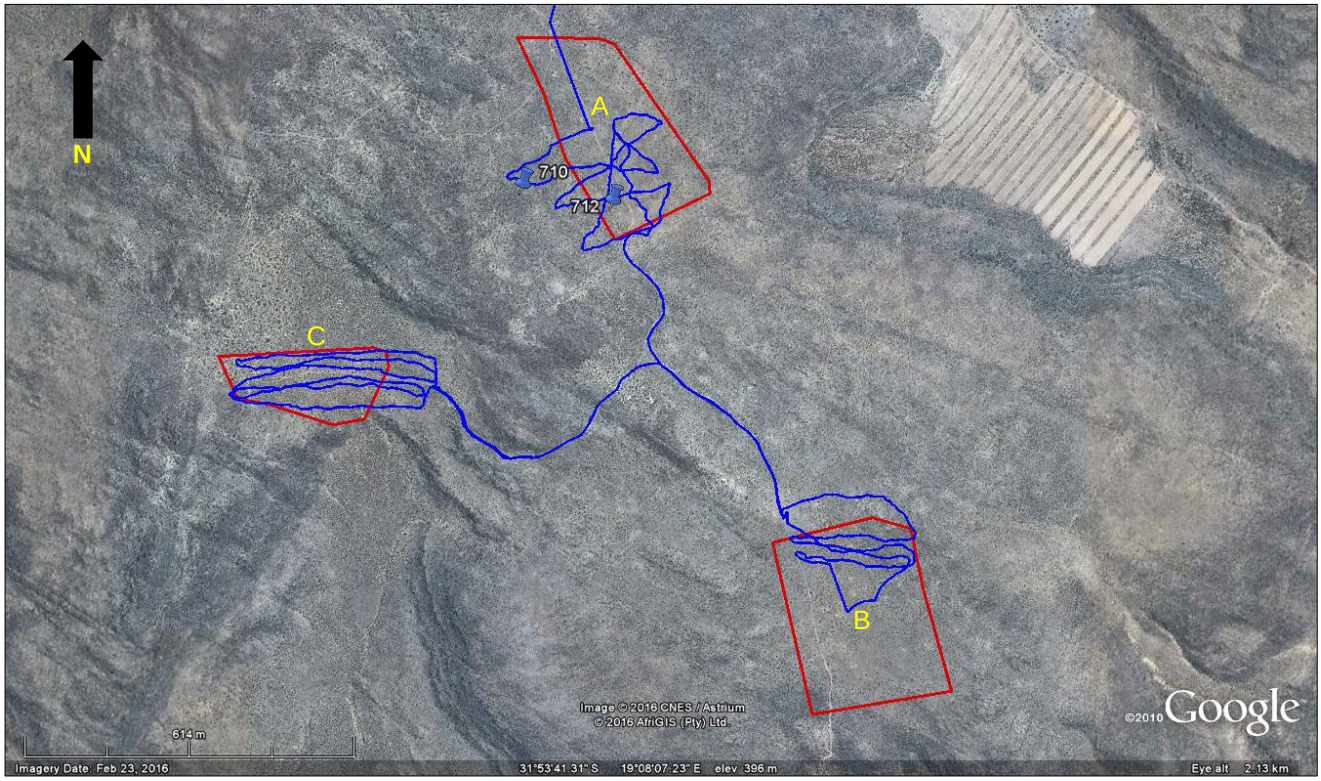


Figure 13. Google map of the 3 proposed new Rooibos fields (A, B & C) on Farm 958. Blue lines are track paths.

9. CONCLUSION

The proposed activity (i. e. cultivation of new Rooibos tea fields) is not likely to impact on significant archaeological heritage.

No settlement sites or evidence of human occupation were found during the baseline study.

Indications are that, in terms of archaeological heritage, the proposed new fields are not a sensitive landscape.

The impact significance of the proposed development on important archaeological heritage is therefore assessed as LOW.

10. RECOMMENDATIONS

With regard to the proposed cultivation of new Rooibos tea fields on Farm 958 Tweeriviere, the following recommendations are made:

1. No mitigation is required prior to development activities commencing.

2. If any other unmarked human remains, or ostrich eggshell caches, for example, are exposed or uncovered during excavations these must immediately be reported to Heritage Western Cape (Att: Ms Natasha Higgit 021), or the contracted archaeologist (Jonathan Kaplan 082 321 0172).

3. The above recommendations must be incorporated into the Environmental Management Plan (EMP) for the proposed development

11. REFERENCES

Amschwand, N. 2009. A short history of the Onder-Bokkeveld. Aquaknowledge: Cape Town.

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Webley, L. & Orton, J. 2012. Archaeological Impact Assessment, proposed construction of chalets and associated infrastructure on existing camp sites in the Oorlogskloof Nature Reserve, Nieuwoudtville, Northern Cape Province. Report prepared for Ikamva Consulting. ACO, Cape Town

ROOIBOS SOIL REPORT

COMPLETE SOIL INVESTIGATION SURVEY TO ASCERTAIN THE SUITABILITY FOR THE CULTIVATION OF VIRGIN SOIL FOR THE PRODUCTION OF ROOIBOS TEA AT SONDERWATERKRAAL AND TWEERIVIER, NIEUWOUDTVILLE AREA, NORTHERN CAPE PROVINCE.

CONTRACT: NC/DALLET/0128, PROJECT NR: 31630

3 DECEMBER 2014

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BVi Consulting Engineers

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INTRODUCTION AND BACKGROUND

BVi Consulting Engineers was appointed to do a complete soil investigation at Sonderwaterkraal and Tweerivier, near Nieuwoudtville in the Northern Cape Province. The purpose of the investigation is to ascertain the suitability of virgin soil for the production of rooibos tea.

Originally approximately 26ha was identified for the soil investigation. However after consultation with the Department of Agriculture and local community members, approximately 39ha was identified and investigated.
The proposed development consists of 2 areas at Sonderwaterkraal and 3 areas at Tweerivier.

The proposed area was surveyed, and profile pits were set out on a 100m x 100m grid. The profile pits were prepared by a local contractor and filled-up after completion of the soil pit investigation.

BVi requested the services of Digital Soils Africa, under direction of Dr Pieter le Roux to assist with the soil investigation. Dr le Roux is very well known in the field of soil science and is an expert in this area.

The field work was completed in September, where after the chemical analysis and reporting was done.

Please find attached the complete soil report for Sonderwaterkraal and Tweerivier. The contour map is also available in electronic format.

I trust that the report provides the necessary information as required. Please contact me should you require any further information.

M. PRETORIUS Pr. Eng.

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Soil Suitability for Rooibos Tea Production

A soil survey to ascertain the suitability for cultivation of virgin soil for the production of Rooibos tea at Tweerivier and Sonderwaterkraal, Nieuwoudtville area, Northern Cape Province.

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EXECUTIVE SUMMARY

The sandy, acid Clovelly soils of these farms are suitable for production of Rooibos Tea and meet all the norms of the Department. Lack of research on the required soil water regime expressed in soil depth x rainfall requirements of Rooibos Tea, the minimum soil depth was set at 1 m. This boundary should be applied cautiously as the soils has a morphology indicating a wet subsoil that can store water and is getting interflow water from upslope. Rooibos Tea is drought resistant and recorded to grow wild on very shallow soils. Areas indicated as suitable have a relatively wet soil water regime. It stores water deep with limited soil evaporation (because it is sand), it stores draining water in the deep subsoil and make it available between rain events (as the underlying sandstone is impermeable) and receive water from higher lying Mispah soils (water flows on the impermeable layer).

The climate is suitable. The farms are close to the scarp and higher rain is expected here. Rainfall is expected to drop drastically and temperatures to rise, lowering effective rain, to the inland. It also explains why the farms are on the edge of the Rooibos Tea production area. Rooibos Tea grows wild on the sites and shows vitality in spite of being harvested regularly for “Wild Rooibos Tea” which has a very high market value. The two farmers currently produce organic Rooibos Tea as a sole and main income respectively.

Potential degradation hazards are soil compaction by mechanical operations and wind erosion. These limitations need to be addressed right from the beginning.

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1. INTRODUCTION

Soil surveys are important for effective planning and optimization of land use, decreasing the risk of land degradation and increasing the benefit of effective management. Soil suitability for dry land cropping is very dependent on soil type, effective depth and intended crop, with different scenarios requiring a different management practice for optimized results.

The main objective was to map the soils Sonderwaterkraal and Tweerivier and interpret the morphology, chemistry in terms of suitability for Rooibos Tea production. The properties limiting the suitability of the soils and precautionary measures normally recommended for sustained use will also be given.

1.1. Site Description

Sonderwaterkraal and Tweerivier is situated roughly 55 km south of Nieuwoudtville, Northern Cape Province (Figure 1.1).

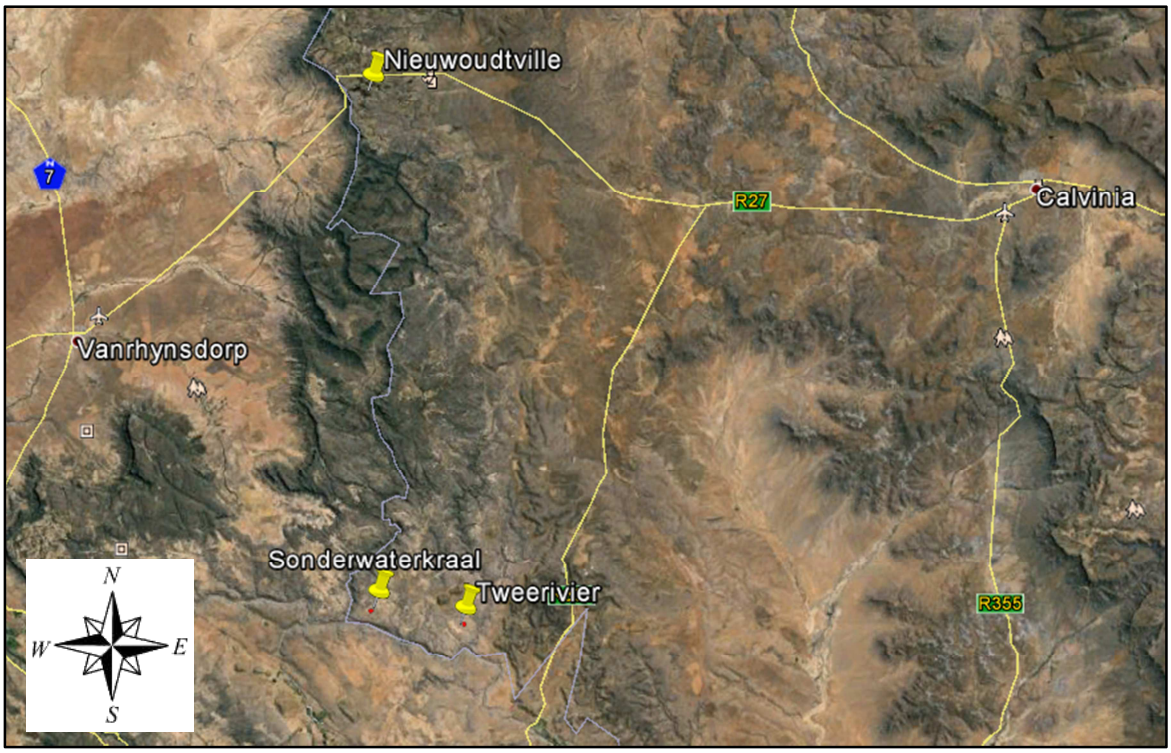

Figure 1.1 Location of Sonderwaterkraal and Tweerivier, Northern Cape Province.

Nieuwoudtville has a Mediterranean climate, receiving most of the 250 m.a.p. in the winter (Figure 1.2). The rainfall peaks in June, July and August, with the least rain in December, January and

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February. The average monthly temperatures are seen in Figure 1.3. The average daily temperatures range from 30.1 C in summer to 17 C in in winter.

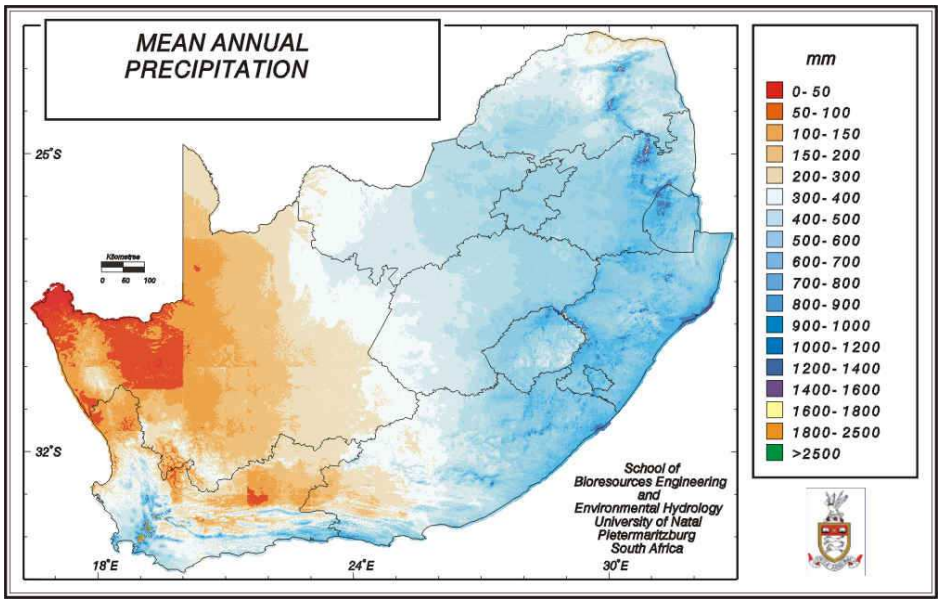

Figure 1.2 Mean Annual Precipitation of South Africa

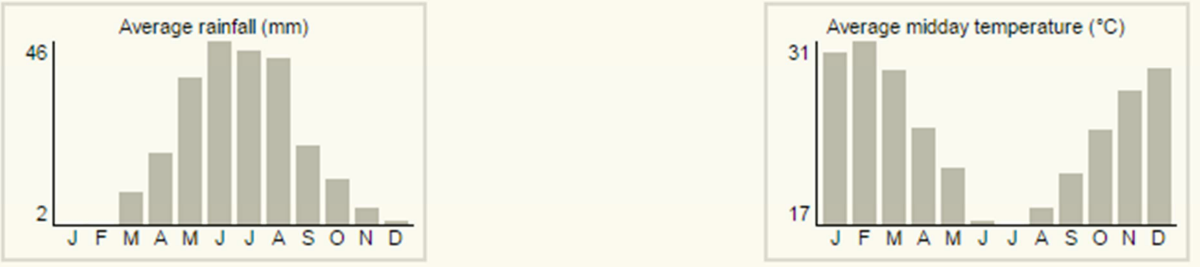

Figure 1.3 Average monthly rainfall and midday temperatures of Nieuwoudtville.

2. METHODOLOGY

The survey consisted of 44 profiles, the procedure included the identification and demarcation of master horizons. Diagnostic horizons were described and classified according to Soil Classification Working Group (1991). Samples were taken from representative soil profiles from each diagnostic horizon. pH was measured using 1.0 N KCl extract at 1:2.5 ration. The P content was measured using a spectrophotometer and a Bray I extract 1:7.5 ratio. Two methods were used in determining the cation concentrations. Firstly the soil was leached with Ammonium Acetate extract with a 1:10 ratio and Trace elements were calculated by an 0.1 N HCl extract at a 1:2.5 ratio. Secondly cations were determined by the Mehlich III extract with a 1:10 ratio. The CEC was determined by saturation of

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Ammonium Acetate and extracted by 1.0 N KCL. Hydrometer was used to calculate the texture of the samples.

3. RESULTS

3.1. Soil Classification

Soil Form	Master Horizon	Diagnostic Horizon
Clovelly (Cv)	A	Orthic
	B	Yellow-brown apedal B horizon
	C	Unspecified

3.2. Morphological Properties

The Clovelly soils with slightly darkened Orthic A horizon, yellow-brown apedal B horizons as subsoil and underlying fractured rock, as is the case in these sites, are freely drained soils. Red accumulations in the fractured quartzite underlying the Clovelly varies from hardened concretions formed around quartzite fractures to hardened surfaces of quartzite fractures and soft impregnated quartzite fractures and solid rocks.

3.3. Chemical Properties

The pH of the soils varies from very strongly acidic to neutral. It is generally low throughout the profile. The K and Ca contents are low and the Na and Mg concentration very low. The CEC is extremely low due to a low clay content and humus content.

There is a difference in soil chemical properties between the two areas surveyed. There is an increase in CEC in the profiles at Sonderwaterkraal, thereby increasing cation concentration in the soil. Even with increase in chemical properties the properties are still low.

Table 1 Selected soil chemical properties.

Ref No	pH (KCl)	K	Na	Ca	Mg	CEC
		mg/kg	mg/kg	mg/kg	mg/kg	cmol(c)/kg
N1.1	4.38	37	9	70	6	0.62
N1.2	4.06	41	8	33	7	0.48
N9.1	4.59	22	8	26	5	0.21
N9.2	4.01	20	6	14	1	0.43
N18.1	4.84	40	7	35	7	0.28
N18.2	5.28	35	8	38	10	0.32
N22.1	6.31	34	13	46	12	0.40

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Ref No	pH (KCl)	K	Na	Ca	Mg	CEC
N22.2	4.30	34	9	25	8	0.49
N27.1	4.51	30	6	39	13	0.36
N27.2	4.37	28	5	18	2	0.14
S15.1	5.74	121	29	1005	38	3.48
S15.2	6.20	51	241	2316	20	6.42
S15.2	6.01	31	411	2261	15	5.22
S17.1	6.29	61	8	918	24	2.46
S17.3	6.24	32	16	2381	10	8.33
S19.1	5.80	97	7	1236	30	4.67
S19.2	6.57	146	31	1970	37	5.43
S19.3	6.37	26	76	2301	10	9.21
S21.1	6.59	90	12	1708	25	6.42
S21.3	6.85	40	101	2740	15	8.32
S23.1	6.03	79	25	1319	43	5.14
S23.2	6.74	30	48	2130	15	7.76
S23.3	6.12	38	56	1612	16	4.33
S25.1	6.56	234	138	2243	76	7.28
S25.2	6.39	30	17	394	14	1.06
S25.3	6.03	34	60	2315	38	8.63
S1.1	5.38	22	8	61	6	0.31
S1.2	4.35	17	7	27	6	0.28
S7.1	4.11	19	12	37	6	0.33
S7.2	4.40	17	9	14	3	0.24
S23.1	4.47	41	16	50	12	0.51
S23.2	4.23	34	10	51	15	0.46

Table 2 General interpretation of pH ranges (Bruce & Raymond, 1982)

pH	Rating
>9	Very strongly alkaline
9 - 8.5	Strongly alkaline
8.4 - 7.9	Moderately alkaline
7.8 - 7.4	Mildly alkaline
7.3 - 6.6	Neutral
6.5 - 6.1	Slightly acid
6 - 5.6	Moderately acidic
5.5 - 5.1	Strongly acidic
5 - 4.5	Very strongly

The low chemical values are probably more a result of the very low base status rather than leaching (Table 3). The low clay contents prohibit high CEC.

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Table 3 Different concentrations of Ca, Mg, Na and K in soil (Metson, 1961)

Cation	Very low	Low	Moderate	High	Very high
Ca mg/kg	0- 400	400 - 1000	1000-2000	2000-4000	>4000
Mg mg/kg	0- 35	35- 120	120- 360	360-970	>970
Na mg/kg	0- 23	23- 70	70- 160	160- 460	>460
K mg/kg	0- 80	80- 120	120- 275	275- 780	>780

3.4. Physical Properties

The clay content of the soils is very low. The difference in chemistry does not correlate with texture of the soil the soil texture is relatively similar at both sites.

Table 4 Particle size distribution and textual class

Ref No	Clay (%)	Silt(%)	Sand(%)	Texture class
	8	2	90	Sand
N1.1	8	2	90	Sand
N1.2	8	2	90	Sand
N9.1	8	2	90	Sand
N9.2	8	2	90	Sand
N18.1	8	2	90	Sand
N18.2	8	2	90	Sand
N22.1	8	2	90	Sand
N22.2	8	2	90	Sand
N27.1	8	2	90	Sand
N27.2	8	3	89	Sand
S15.1	8	5	87	Sand
S15.2	10	5	85	Sand
S15.2	6	4	90	Sand
S17.1	10	10	80	Loamy Sand
S17.3	6	2	90	Sand
S19.1	8	2	90	Sand
S19.2	10	8	82	Loamy Sand
S19.3	6	3	91	Sand
S21.1	10	6	84	Loamy Sand
S21.3	6	5	89	Sand
S23.1	6	9	85	Sand
S23.2	8	5	87	Sand
S23.3	8	8	84	Loamy Sand
S25.1	6	4	90	Sand
S25.2	8	6	86	Sand
S25.3	8	2	90	Sand
S1.1	8	2	90	Sand
S1.2	8	14	78	Loamy Sand

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Ref No	Clay (%)	Silt(%)	Sand(%)	Texture class
S7.1	8	2	90	Sand
S7.2	8	2	90	Sand
S23.1	8	2	90	Sand
S23.2	6	4	90	Sand

4. SUITABILITY FOR ROOIBOS TEA PRODUCTION

4.1. Environmental indicators

Both farmers are cultivating Rooibos Tea on their farms as a primary income. Wild Rooibos Tea plants are growing on the areas delineated for potential cultivation. The farms are on the edge of the scarp expected to get more rain than the inland plato.

4.2. Soil morphology

The deep, sandy Clovelly soil with some oxidation morphology in the saprolite is suitable for dryland cropping of Rooibos Tea. The depth criterion should be applied with care as the soil stores large amounts of water in the deep subsoil.

The texture of the soils are sandy and will therefore water infiltration during rain will be high, enhancing the effectivity of rain. The rain water will also be stored deep in the subsoil limiting soil evaporation. The water holding capacity is limited by the sandy nature of the soil but the soil depth and impermeable underlying quarzitic sandstone stores large amounts of water. Redoximorphic features in the fractured rock are an indication that water accumulates on underlying impermeable rock. Due to the slope of the land the water table forming in the fractured rock, water will flow down slope in the deep subsoil and fractured rock. This water will be available for established crops and increase production.

4.3. Soil chemistry

The acidic, leached sand is typical of the soils of the area where Rooibos are cultivated (Lötter & Maitre, 2014).

4.4. Soil fertility

The intention of the farmers is to do organic farming excluding fertilisation of any kind.

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4.5. Agronomic potential

No research results are available to guide evaluation of soil analysis for Rooibos Tea. It grows under annual rainfall as low as 250 mm and soils as shallow as 70mm (Lötter & Maitre, 2014). Roots grow deeper than 2m. It requires well drained sandy soil with pH between 4.5 en 5.5 and low P levels of less than 25 ppm. The area is climatically marginal.

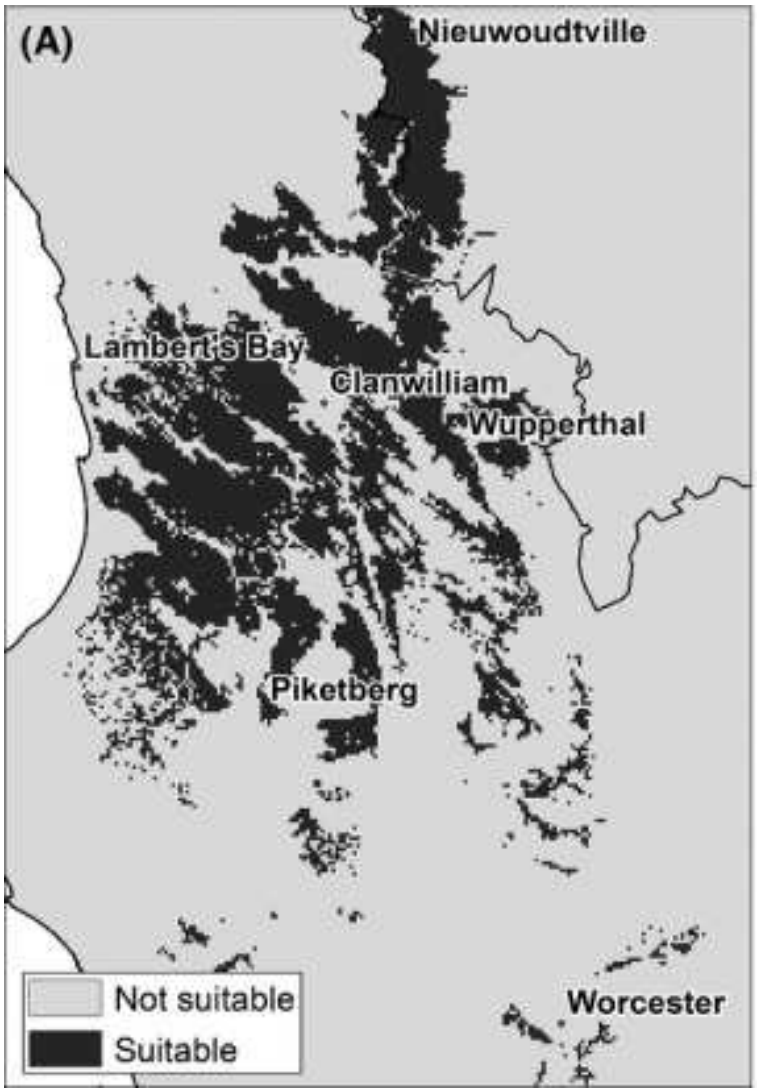

Figure 4.5 Suitability areas for Rooibos Tea (Lötter & Maitre, 2014).

5. MAPS

Soil class and depth maps for five areas are presented, three for Tweerivier (N1, N2 and N3) (Figures 5.1 and 5.2) and two for Sonderwaterkraal (S1 and S2) (Figures 5.3 and 5.4).

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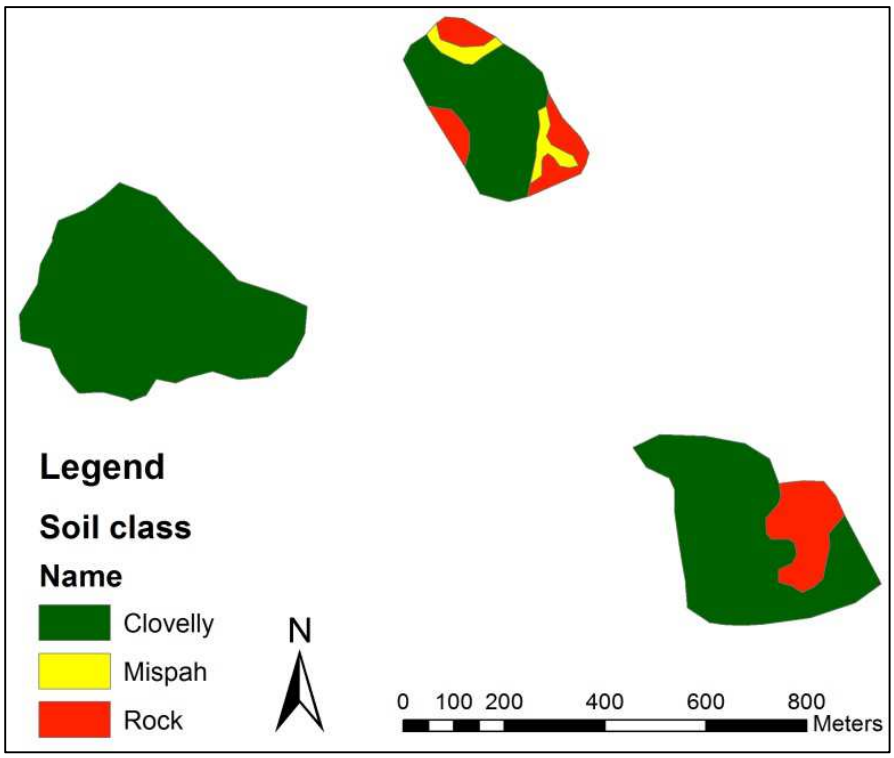

Figure 5.1: Soil class map for the three areas of Tweerivier farm

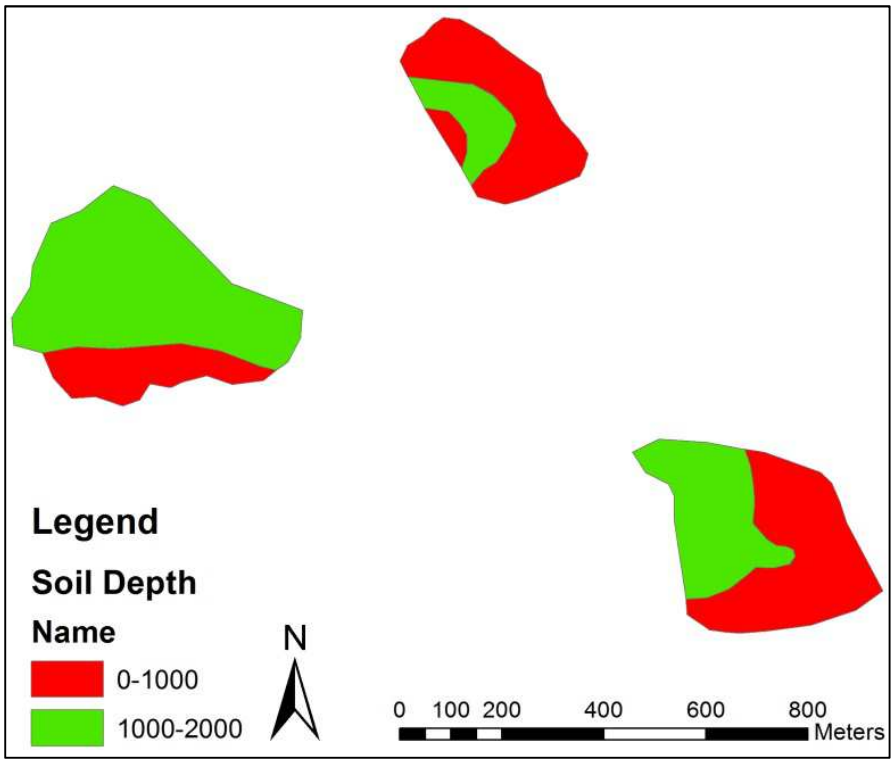

Figure 5.2: Soil depth map for the three areas of Tweerivier farm

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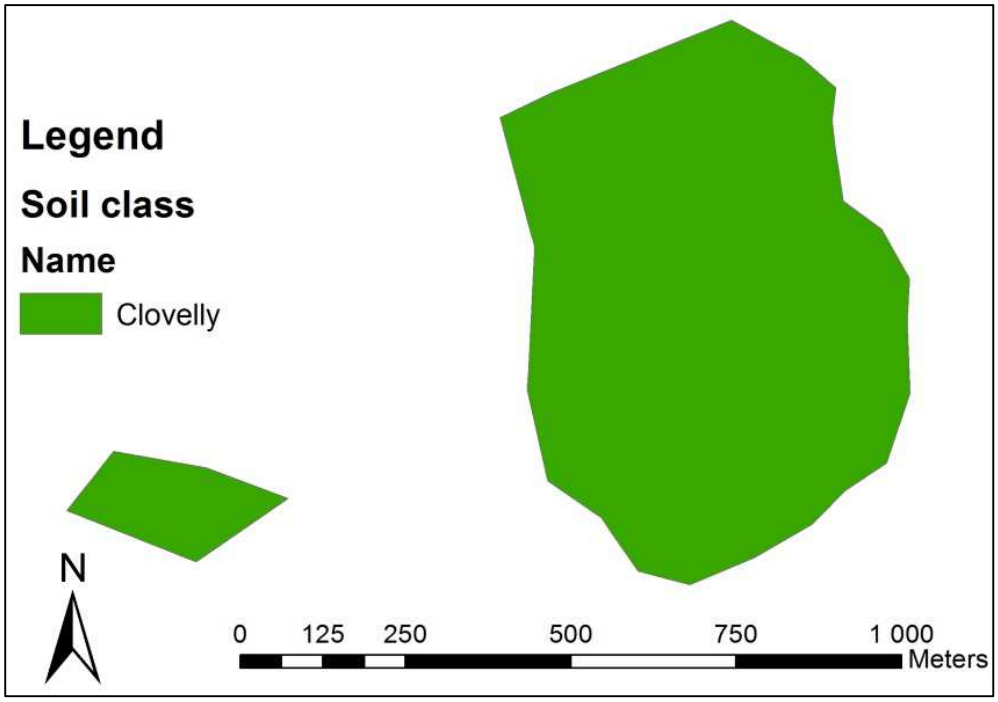

Figure 5.3: Soil class map for the two areas of Sonderwaterkraal

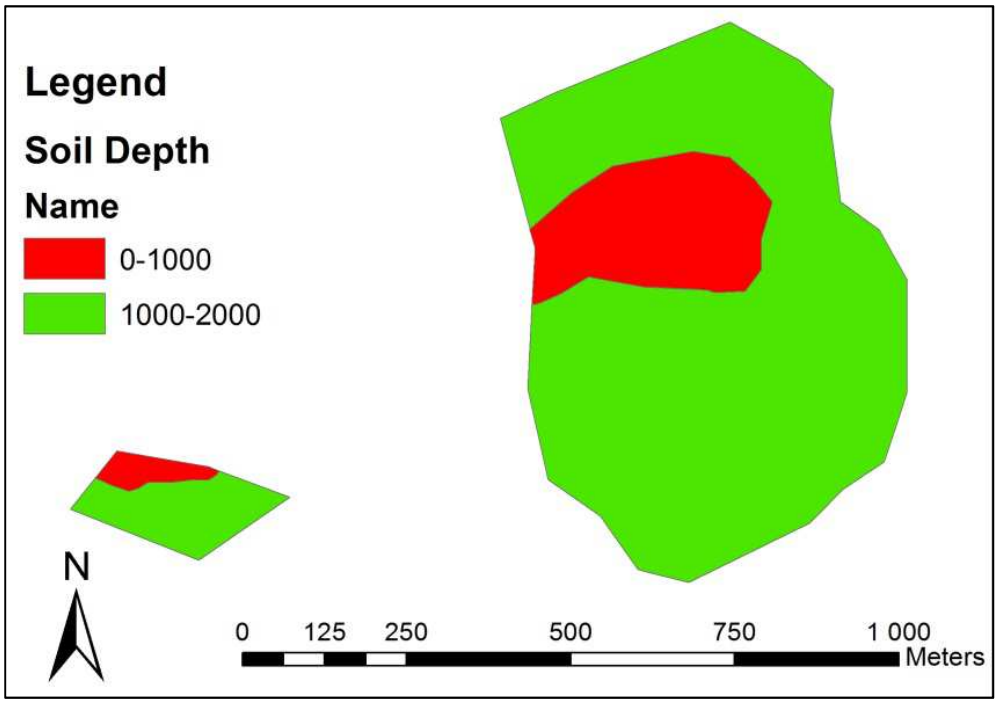

Figure 5.4: Soil depth map for the two areas of Sonderwaterkraal

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6. RECOMMENDATIONS

Both farmers currently produce organic Rooibos Tea as a main income. This implies that the climate is suitable. Rooibos Tea grows wild on the sites earmarked for cropping. The farms are close to the edge of the scarp suggesting a localised high rainfall.

The Clovelly soils of these farms are suitable for production of Rooibos Tea and meet all the norms of the Department. Lack of research on the depth x climate requirement of Rooibos Tea the minimum soil depth was set at 1 m. This should be applied cautiously as the soils are getting interflow water from upslope and the crop is drought resistant. The terrain is shelving and the transition from 1m deep Clovelly soils to Mispah soils and rock outcrops quite narrow.

Areas indicated as suitable have a relatively wet soil water regime. It stores water in the deep subsoil and receive water from higher lying soils. Although the farms are on the boundary of the Rooibos Tea production area and reliable climate data is not available, the soils indicate relatively wet conditions.

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Appendix 1

Modal profile Description and photograph

Profile No		S2	Soil type	Clovelly (Cv)			Soil Family		Setlagole (3100)
Latitude		19.13477472					Slope		0
Longitude		-31.89081545					Planform curvature		VV
Surface stoniness		Very few					Profile curvature		VV
Chemical weathering		Subsoil					TMU		1
Parent material		In situ weathering sandstone					Occurrence of Flooding		No
Geology		Sandstone					Vegetation		Shrub
Master Horizon	Depth (mm)	Diagnostic Horizon	Transition	Structure			Soil Colour	Mottling	Comment
				Type	Size	Grade			
A	0-80	ot	Clear	Apedal	Single grain	-	7.5 YR 6/4 (Dry) 7.5 YR 5/4 (Wet)	None	-
B	80-3000	ye	-	Apedal	Single grain	-	7.5 YR 6/4 (Dry) 7.5 YR 5/4 (Wet)	None	

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Photograph of modal profile (N2)

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Appendix 2

Soil observations

Sonderwaterkraal					Tweerivier				
Obs	Latitude	Longitude	Soil type	Depth (mm)	**Obs**	Latitude	Longitude	Soil type	Depth (mm)
S1	19.04735	-31.86818611	Cv	1200	**N1**	19.13312	-31.8895528	Cv	500
S2	19.04592778	-31.86856944	Cv	2000	**N3**	19.13465	-31.8897722	Cv	800
S3	19.04502778	-31.86808333	Cv	2000	**N4**	19.1337	-31.89025	Cv	1200
S4	19.04545833	-31.86747222	Cv	1000	**N6**	19.13521	-31.8905972	Cv	700
S5	19.04643333	-31.86771944	Cv	500	**N7**	19.13574	-31.8913583	Ms	200
S6	19.05186111	-31.86588889	Cv	600	**N8**	19.13492	-31.8918	Cv	500
S7	19.05236111	-31.86666389	Cv	2000	**N9**	19.13842	-31.8977694	Cv	1500
S8	19.05289167	-31.86748611	Cv	2000	**N10**	19.13881	-31.898625	Cv	1300
S9	19.05353889	-31.86816667	Cv	2000	**N11**	19.13902	-31.8995111	Cv	550
S10	19.05433333	-31.86775278	Cv	2000	**N12**	19.14008	-31.8992056	Cv	950
S11	19.05474167	-31.86654167	Cv	2000	**N14**	19.13974	-31.8982444	Cv	1000
S12	19.055175	-31.86530833	Cv	2000	**N16**	19.1407	-31.8980472	Cv	600
S13	19.05558333	-31.86605833	Cv	2000	**N17**	19.1411	-31.8988444	Cv	650
S14	19.05445278	-31.86577778	Cv	2000	**N18**	19.13904	-31.8974083	Cv	1200
S15	19.05453333	-31.86447778	Cv	1600	**N19**	19.13875	-31.8971139	Cv	1500
S16	19.05365556	-31.86503889	Cv	450	**N20**	19.1384	-31.896625	Cv	1800
S18	19.05296389	-31.86539444	Cv	2000	**N21**	19.13754	-31.8968361	Cv	1800
S19	19.05338889	-31.86631111	Cv	2000	**N22**	19.12729	-31.8943722	Cv	2000
S20	19.05391314	-31.86689736	Cv	2000	**N23**	19.12827	-31.8943731	Cv	2000

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S21	19.0514186	-31.86782334	Cv	600	**N24**	19.12935	-31.8942361	Cv	2000
S22	19.05179722	-31.863875	Cv	2000	**N25**	19.12939	-31.8950833	Cv	600
S23	19.05236944	-31.86316389	Cv	1200	**N26**	19.12828	-31.8951722	Cv	400
S24	19.05288611	-31.86246944	Cv	2000	**N27**	19.13448	-31.8918028	Cv	800
S25	19.05393889	-31.86290278	Cv	450					
S26	19.05325278	-31.86368889	Cv	2000					

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Appendix 3

Table 1 Soil chemical properties with Ammonium Acetate extraction results

Ref No	pH (KCl)	PBray1	K	Na	Ca	Mg	EA.KCl	%Ca	%Mg	%K	%Na	ACID SAT
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	cmol(c)/kg	%	%	%	%	%
N1.1	4.38	3	37	9	70	6	0.37	38.94	5.12	10.67	4.33	40.94
N1.2	4.06	3	41	8	33	7	0.31	24.77	8.13	15.76	5.36	45.98
N9.1	4.59	9	22	8	26	5	0.00	49.94	16.19	21.36	12.52	0.00
N9.2	4.01	9	20	6	14	1	0.43	11.74	1.41	8.80	4.26	73.79
N18.1	4.84	2	40	7	35	7	0.00	47.44	16.30	27.61	8.65	0.00
N18.2	5.28	7	35	8	38	10	0.00	47.70	21.39	22.42	8.49	0.00
N22.1	6.31	5	34	13	46	12	0.00	49.22	20.46	18.27	12.04	0.00
N22.2	4.30	4	34	9	25	8	0.19	24.79	12.92	17.06	7.54	37.69
N27.1	4.51	5	30	6	39	13	0.00	48.39	25.55	19.15	6.91	0.00
N27.2	4.37	10	28	5	18	2	0.00	44.30	9.66	34.83	11.21	0.00
S15.1	5.74	5	121	29	1005	38	0.00	87.03	5.37	5.38	2.21	0.00
S15.2	6.20	1	51	241	2316	20	0.00	89.60	1.29	1.01	8.10	0.00
S15.2	6.01	1	31	411	2261	15	0.00	85.04	0.92	0.59	13.45	0.00
S17.1	6.29	7	61	8	918	24	0.00	92.24	3.96	3.13	0.67	0.00
S17.3	6.24	1	32	16	2381	10	0.00	98.06	0.70	0.68	0.56	0.00
S19.1	5.80	6	97	7	1236	30	0.00	92.13	3.70	3.68	0.49	0.00
S19.2	6.57	2	146	31	1970	37	0.00	92.43	2.82	3.50	1.25	0.00
S19.3	6.37	1	26	76	2301	10	0.00	95.98	0.70	0.54	2.77	0.00
S21.1	6.59	4	90	12	1708	25	0.00	94.60	2.25	2.56	0.59	0.00
S21.3	6.85	1	40	101	2740	15	0.00	95.39	0.84	0.71	3.06	0.00
S23.1	6.03	3	79	25	1319	43	0.00	90.87	4.85	2.77	1.51	0.00
S23.2	6.74	1	30	48	2130	15	0.00	96.28	1.12	0.70	1.90	0.00
S23.3	6.12	1	38	56	1612	16	0.00	94.45	1.54	1.13	2.87	0.00

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Ref No	pH (KCl)	PBray1	K	Na	Ca	Mg	EA.KCl	%Ca	%Mg	%K	%Na	ACID SAT
S25.1	6.56	12	234	138	2243	76	0.00	86.04	4.76	4.59	4.60	0.00
S25.2	6.39	3	30	17	394	14	0.00	88.15	5.02	3.45	3.37	0.00
S25.3	6.03	1	34	60	2315	38	0.00	94.62	2.54	0.72	2.13	0.00
S1.1	5.38	5	22	8	61	6	0.00	68.33	11.41	12.27	7.98	0.00
S1.2	4.35	7	17	7	27	6	0.24	27.76	9.25	9.05	5.97	47.96
S7.1	4.11	2	19	12	37	6	0.19	35.26	9.94	9.32	9.61	35.87
S7.2	4.40	3	17	9	14	3	0.19	19.31	5.65	11.61	10.41	53.01
S23.1	4.47	4	41	16	50	12	0.18	35.70	13.81	15.02	9.81	25.66
S23.2	4.23	14	34	10	51	15	0.12	40.63	20.19	13.69	6.64	18.85

Ref No	Ca:Mg	(Ca+Mg)/K	Mg:K	S-Value	Na:K	T	Density	S AmAc	CEC
	1.5-4.5	**10.0-20.0**	**3.0-4.0**	**cmol(+)/kg**		**cmol(c)/kg**	**g/cm3**	**mg/kg**	**cmol(c)/kg**
N1.1	7.60	4.13	0.48	0.53	0.41	0.89	1.49	5.06	0.62
N1.2	3.05	2.09	0.52	0.36	0.34	0.67	1.53	3.03	0.48
N9.1	3.09	3.10	0.76	0.26	0.59	0.26	1.56	2.46	0.21
N9.2	8.32	1.49	0.16	0.15	0.48	0.58	1.56	3.46	0.43
N18.1	2.91	2.31	0.59	0.37	0.31	0.37	1.51	1.73	0.28
N18.2	2.23	3.08	0.95	0.40	0.38	0.40	1.55	1.78	0.32
N22.1	2.41	3.81	1.12	0.47	0.66	0.47	1.56	3.24	0.40
N22.2	1.92	2.21	0.76	0.32	0.44	0.51	1.56	2.32	0.49
N27.1	1.89	3.86	1.33	0.40	0.36	0.40	1.54	1.57	0.36
N27.2	4.58	1.55	0.28	0.21	0.32	0.21	1.54	3.14	0.14
S15.1	16.19	17.18	1.00	5.77	0.41	5.77	1.45	0.70	3.48
S15.2	69.49	89.68	1.27	12.92	7.99	12.92	1.68	10.37	6.42
S15.2	92.31	146.05	1.57	13.29	22.85	13.29	1.55	61.46	5.22

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Ref No	Ca:Mg	(Ca+Mg)/K	Mg:K	S-Value	Na:K	T	Density	S AmAc	CEC
S17.1	23.30	30.70	1.26	4.97	0.21	4.97	1.53	4.79	2.46
S17.3	139.51	145.95	1.04	12.14	0.83	12.14	1.50	5.38	8.33
S19.1	24.88	26.03	1.01	6.71	0.13	6.71	1.63	4.70	4.67
S19.2	32.80	27.21	0.80	10.66	0.36	10.66	1.64	4.55	5.43
S19.3	136.71	177.44	1.29	11.99	5.08	11.99	1.54	8.58	9.21
S21.1	41.97	37.77	0.88	9.03	0.23	9.03	1.64	5.43	6.42
S21.3	114.02	136.06	1.18	14.36	4.33	14.36	1.54	9.24	8.32
S23.1	18.74	34.57	1.75	7.26	0.54	7.26	1.62	1.64	5.14
S23.2	85.93	138.81	1.60	11.06	2.70	11.06	1.65	5.17	7.76
S23.3	61.26	84.70	1.36	8.53	2.53	8.53	1.56	8.34	4.33
S25.1	18.06	19.77	1.04	13.04	1.00	13.04	1.49	10.49	7.28
S25.2	17.54	27.02	1.46	2.24	0.98	2.24	1.44	0.40	1.06
S25.3	37.32	135.63	3.54	12.23	2.97	12.23	1.58	5.85	8.63
S1.1	5.99	6.50	0.93	0.45	0.65	0.45	1.60	3.29	0.31
S1.2	3.00	4.09	1.02	0.25	0.66	0.49	1.59	2.22	0.28
S7.1	3.55	4.85	1.07	0.33	1.03	0.52	1.53	3.68	0.33
S7.2	3.42	2.15	0.49	0.17	0.90	0.37	1.57	2.57	0.24
S23.1	2.58	3.30	0.92	0.52	0.65	0.70	1.52	4.24	0.51
S23.2	2.01	4.44	1.47	0.51	0.49	0.63	1.56	2.70	0.46

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Table 2 Mehlich III results

Ref No	Ref No	P	K	Na	Ca	Mg	EA.KCl	%Ca	%Mg	%K	%Na	ACID SAT
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	cmol(c)/kg	%	%	%	%	%
N1.1	N1.1	6	41	11	115	11	0.37	48.44	7.75	8.86	4.03	30.93
N1.2	N1.2	6	45	13	70	15	0.31	36.85	12.82	12.06	5.98	32.29
N9.1	N9.1	8	23	7	28	8	0.00	47.62	21.73	20.15	10.50	0.00
N9.2	N9.2	7	22	7	21	4	0.43	16.03	5.60	8.61	4.41	65.36
N18.1	N18.1	3	43	7	41	11	0.00	46.54	21.16	25.20	7.10	0.00
N18.2	N18.2	9	38	7	38	14	0.00	44.19	26.33	22.70	6.78	0.00
N22.1	N22.1	7	34	13	58	19	0.00	48.89	26.69	14.82	9.60	0.00
N22.2	N22.2	3	39	10	39	12	0.19	30.69	16.16	15.76	7.05	30.34
N27.1	N27.1	7	32	9	57	21	0.00	49.16	29.67	14.24	6.93	0.00
N27.2	N27.2	13	31	7	27	7	0.00	44.91	19.22	26.26	9.61	0.00
S15.1	15.1	48	134	30	1193	84	0.00	83.68	9.70	4.81	1.82	0.00
S15.2	15.2	12	54	253	3479	55	0.00	91.15	2.37	0.72	5.76	0.00
S15.2	15.2	11	36	423	4286	46	0.00	90.27	1.59	0.39	7.75	0.00
S17.1	17.1	21	65	14	1822	71	0.00	91.85	5.86	1.68	0.61	0.00
S17.3	17.3	9	35	19	13575	47	0.00	99.18	0.57	0.13	0.12	0.00
S19.1	19.1	31	92	11	1476	80	0.00	88.71	7.91	2.83	0.56	0.00
S19.2	19.2	14	154	26	2632	75	0.00	92.11	4.32	2.76	0.80	0.00
S19.3	19.3	10	26	79	5144	36	0.00	97.33	1.12	0.25	1.30	0.00
S21.1	21.1	20	86	14	2180	65	0.00	93.07	4.54	1.88	0.51	0.00
S21.3	21.3	7	43	92	3482	39	0.00	95.46	1.75	0.60	2.19	0.00
S23.1	23.1	21	76	23	1439	73	0.00	88.95	7.40	2.40	1.25	0.00
S23.2	23.2	8	35	45	2687	37	0.00	95.79	2.16	0.64	1.41	0.00
S23.3	23.3	10	40	59	2264	42	0.00	94.16	2.85	0.86	2.13	0.00
S25.1	25.1	39	244	142	2880	153	0.00	85.24	7.41	3.69	3.65	0.00
S25.2	25.2	16	40	23	826	54	0.00	86.53	9.24	2.17	2.06	0.00

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Ref No	Ref No	P	K	Na	Ca	Mg	EA.KCl	%Ca	%Mg	%K	%Na	ACID SAT
S25.3	25.3	6	46	49	2502	69	0.00	93.30	4.22	0.88	1.60	0.00
S1.1	S1.1	4	19	9	80	12	0.00	68.54	16.25	8.54	6.67	0.00
S1.2	S1.2	9	20	8	38	9	0.24	32.25	12.98	8.68	6.20	39.89
S7.1	S7.1	2	16	8	31	8	0.19	31.94	13.56	8.53	7.16	38.81
S7.2	S7.2	2	21	10	29	7	0.19	29.60	11.29	10.97	8.49	39.64
S23.1	S23.1	5	46	14	57	15	0.18	37.25	15.88	15.44	7.80	23.63
S23.2	S23.2	16	34	11	93	22	0.12	51.70	20.29	9.67	5.25	13.08

Continued

Ref No	Ca:Mg	(Ca+Mg)/K	Mg:K	S-Value	Na:K	T	Density	Fe	Mn	Cu	Zn	S	B	Al
	1.5-4.5	**10.0-20.0**	**3.0-4.0**	**cmol(+)/kg**		**cmol(c)/kg**	**g/cm3**			**mg/kg**				
N1.1	6.25	6.34	0.87	0.82	0.45	1.18	1.49	46.62	2.99	0.15	0.32	4.80	0.25	136.03
N1.2	2.87	4.12	1.06	0.65	0.50	0.95	1.53	36.70	4.56	0.30	0.28	4.90	0.24	131.53
N9.1	2.19	3.44	1.08	0.29	0.52	0.29	1.56	29.73	1.74	0.11	0.20	3.57	0.29	124.64
N9.2	2.86	2.51	0.65	0.23	0.51	0.65	1.56	32.85	0.49	0.09	0.14	2.98	0.24	134.07
N18.1	2.20	2.69	0.84	0.44	0.28	0.44	1.51	24.45	2.89	0.09	0.27	3.80	0.32	86.16
N18.2	1.68	3.11	1.16	0.43	0.30	0.43	1.55	31.39	0.99	0.07	0.09	2.27	0.23	128.40
N22.1	1.83	5.10	1.80	0.59	0.65	0.59	1.56	48.52	3.18	0.06	0.15	3.88	0.24	107.02
N22.2	1.90	2.97	1.03	0.44	0.45	0.63	1.56	47.01	0.44	0.09	0.13	4.04	0.26	88.38
N27.1	1.66	5.53	2.08	0.58	0.49	0.58	1.54	24.30	7.18	0.22	0.42	3.11	0.27	132.98
N27.2	2.34	2.44	0.73	0.30	0.37	0.30	1.54	32.87	1.92	0.10	0.14	3.08	0.24	189.13
S15.1	8.63	19.43	2.02	7.13	0.38	7.13	1.45	38.35	33.22	0.92	0.34	5.06	0.34	235.01
S15.2	38.44	129.95	3.29	19.09	8.00	19.09	1.68	15.25	27.62	1.08	0.23	11.75	0.36	124.59
S15.2	56.65	236.86	4.11	23.74	19.98	23.74	1.55	3.27	6.23	0.46	0.34	82.13	0.82	3.61
S17.1	15.68	58.28	3.49	9.92	0.37	9.92	1.53	19.46	17.10	0.57	0.37	11.36	0.41	84.92
S17.3	174.50	760.56	4.33	68.44	0.92	68.44	1.50	3.55	5.49	0.80	0.35	19.77	0.39	4.86

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Ref No	Ca:Mg	(Ca+Mg)/K	Mg:K	S-Value	Na:K	T	Density	Fe	Mn	Cu	Zn	S	B	Al
S19.1	11.22	34.16	2.80	8.32	0.20	8.32	1.63	22.90	22.18	0.65	0.31	5.85	0.33	112.99
S19.2	21.30	34.98	1.57	14.29	0.29	14.29	1.64	18.41	27.08	0.73	0.24	7.30	0.31	101.89
S19.3	87.25	386.29	4.38	26.43	5.09	26.43	1.54	2.39	4.06	0.80	0.29	21.73	0.53	4.81
S21.1	20.51	51.97	2.42	11.71	0.27	11.71	1.64	24.39	24.91	0.76	0.30	7.24	0.35	147.89
S21.3	54.63	161.21	2.90	18.24	3.63	18.24	1.54	4.09	7.18	0.80	0.25	18.39	0.51	5.63
S23.1	12.02	40.10	3.08	8.09	0.52	8.09	1.62	37.74	29.62	0.87	0.30	5.22	0.36	218.53
S23.2	44.29	153.49	3.39	14.03	2.20	14.03	1.65	19.88	30.31	0.62	0.22	7.49	0.38	186.21
S23.3	33.05	113.20	3.32	12.02	2.49	12.02	1.56	23.06	34.30	1.00	0.26	10.07	0.50	190.00
S25.1	11.51	25.08	2.01	16.89	0.99	16.89	1.49	32.94	39.91	1.32	0.72	12.06	0.57	241.87
S25.2	9.37	44.19	4.26	4.77	0.95	4.77	1.44	43.31	20.99	0.49	0.24	4.30	0.33	135.03
S25.3	22.10	111.14	4.81	13.41	1.82	13.41	1.58	26.63	25.46	0.51	0.27	7.56	0.45	178.58
S1.1	4.22	9.93	1.90	0.58	0.78	0.58	1.60	29.01	2.63	0.15	0.20	3.35	0.23	131.04
S1.2	2.49	5.21	1.49	0.35	0.71	0.59	1.59	37.68	0.40	0.13	0.19	2.70	0.25	128.57
S7.1	2.36	5.34	1.59	0.29	0.84	0.48	1.53	29.74	0.69	0.09	0.18	2.19	0.30	79.37
S7.2	2.62	3.73	1.03	0.30	0.77	0.49	1.57	67.15	0.33	0.10	0.20	4.30	0.23	84.90
S23.1	2.35	3.44	1.03	0.58	0.51	0.76	1.52	36.90	3.47	0.12	0.30	4.17	0.25	101.02
S23.2	2.55	7.44	2.10	0.78	0.54	0.90	1.56	64.43	1.10	0.13	0.95	4.79	0.30	113.82

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Appendix 4a

Site location and contour map: Tweerivier

Tweerivier google printed on 04 Dec 2014 at 11:32:51

NOTES/ LEGEND

DATE	INITIAL	No/CODE	REVISION DESCRIPTION

CLIENT

agriculture, land reform & rural development

Department:
agriculture, land reform & rural development
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

bvi ENGINEERING PROCUREMENT MANAGEMENT

Upington Office
Registration no. 1998/000204/07

nqa ISO 9001 Registered UKAS

BBBEE Level 2

CESA Consulting Engineers South Africa

PROJECT

DEPARTMENT AGRICULTURE: TWEERIVIER SOIL ANALYSIS

DRAWING TITLE

LOCALITY PLAN

APPROVED BY BVi

M. Pretorius	2001 0016	
ENGINEER/TECHNOLOGIST	REG. NO.	DATE

SCALE	1:5000	DRAWN	W. Krauze
DESIGNED	M. Pretorius	CHECKED	M. Pretorius

PLAN NUMBER	REVISION NO.	DATE SAVED
U31630C/100/03	A	04 Dec 2014

Tweerivier google.dwg

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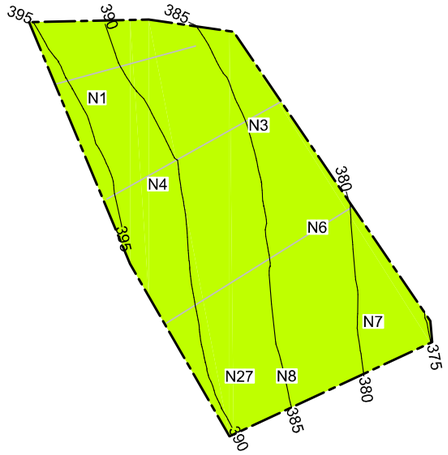

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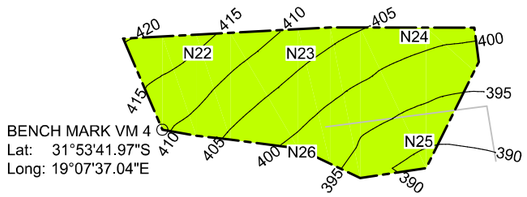

BENCH MARK VM 4
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Long: 19°07'37.04"E

BENCH MARK TRST1
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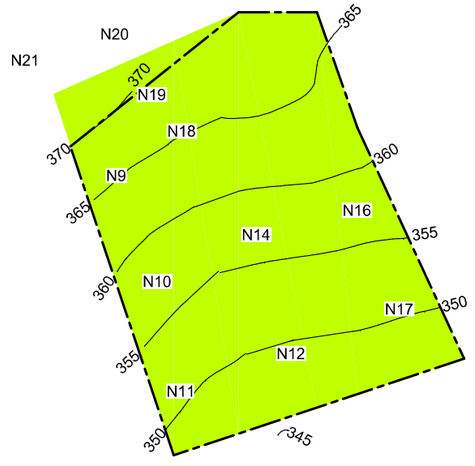
Long: 19°07'57.02"E



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CLIENT

agriculture, land reform & rural development
Department:
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REPUBLIC OF SOUTH AFRICA

bvi ENGINEERING PROCUREMENT MANAGEMENT
Upington Office
Registration no. 1998/000204/07

nqa ISO 9001 Registered UKAS
BBBEE Level 2
CESA Consulting Engineers South Africa

PROJECT

DEPARTMENT AGRICULTURE:
TWEERIVIER SOIL ANALYSIS

DRAWING TITLE

SITE LAYOUT
& CONTOUR MAP

APPROVED BY BVi

M. Pretorius	2001 0016	
ENGINEER/TECHNOLOGIST	REG. NO.	DATE

SCALE	1:5000	DRAWN	J. Pretorius
DESIGNED	M. Pretorius	CHECKED	M. Pretorius

PLAN NUMBER	REVISION NO.	DATE SAVED
U31630C/100/01	A	03 Dec 2014

Tweerivier.dwg

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Appendix 4b

Site location and contour map: Sonderwaterkraal

NOTES/ LEGEND

DATE	INITIAL	No/CODE	REVISION DESCRIPTION

CLIENT

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Department:
agriculture, land reform & rural development
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

bvi ENGINEERING PROCUREMENT MANAGEMENT

Upington Office
Registration no. 1998/060204/07

ISO 9001 Registered

BBBEE Level 2

CESA
Consulting Engineers South Africa

PROJECT

DEPARTMENT AGRICULTURE: SONDERWATERKRAAL SOIL ANALYSIS

DRAWING TITLE

LOCALITY PLAN

APPROVED BY BVi

M. Pretorius	2001 0016	
ENGINEER/TECHNOLOGIST	REG. NO.	DATE

SCALE	1:3500	DRAWN	W. Krauze
DESIGNED	M. Pretorius	CHECKED	M. Pretorius

PLAN NUMBER	REVISION NO.	DATE SAVED
U31630C/100/04	A	04 Dec 2014

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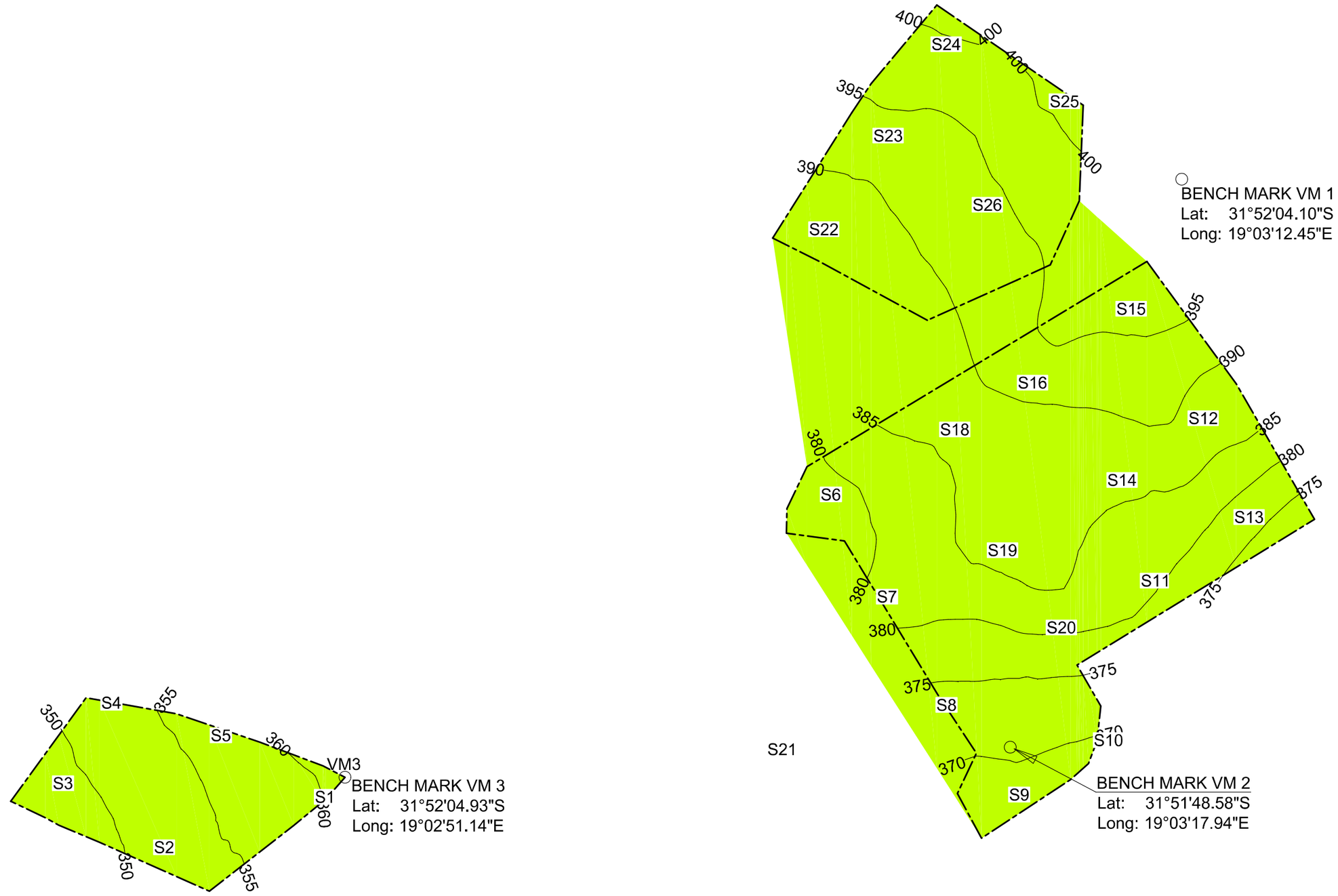

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DATE	INITIAL	No/CODE	REVISION DESCRIPTION

CLIENT

agriculture, land reform & rural development
Department:
agriculture, land reform & rural development
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

bvi ENGINEERING PROCUREMENT MANAGEMENT
Upington Office
Registration no. 1998/000204/07
BBBEE Level 2
CESA Consulting Engineers South Africa

PROJECT

DEPARTMENT AGRICULTURE:
SONDERWATERKRAAL
SOIL ANALYSIS

DRAWING TITLE

SITE LAYOUT
& CONTOUR MAP

APPROVED BY BVI

M. Pretorius — ENGINEER/TECHNOLOGIST
2001 0016 — REG. NO.
DATE

SCALE	1:3500	DRAWN	J. Pretorius
DESIGNED	M. Pretorius	CHECKED	M. Pretorius

PLAN NUMBER	REVISION NO.	DATE SAVED
U31630C/100/02	A	03 Dec 2014

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Pri.Sci.Nat # 400045/08

BOTANICAL ASSESSMENT OF PROPOSED NEW CULTIVATION ON TWEERIVIER FARM, SUID BOKKEVELD, NORTHERN CAPE.

Prepared for: Footprint Environmental Services, Porterville

20 September 2016

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own.

NA Helme (Sole Proprietor: Nick Helme Botanical Surveys)

ABRIDGED CV:

Contact details as per letterhead.

Surname : HELME

First names : NICHOLAS ALEXANDER

Date of birth : 29 January 1969

University of Cape Town, South Africa. BSc (Honours) – Botany (Ecology & Systematics). 1990.

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-western Cape. Since the end of 2001 I have been the Sole Proprietor of Nick Helme Botanical Surveys.

A selection of relevant previous botanical work is as follows:

- Botanical assessment of proposed cultivation on Groot Patrysvlei, Clanwilliam (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on Rem. Andriesgrond 204, Clanwilliam (Cederberg Environmental Assessment Practise 2015)
- Botanical assessment of proposed dam on Grootbos farm, Riversdale (Cederberg Environmental Assessment Practise 2015)
- Botanical assessment of proposed dam on Modderfontein farm, Citrusdal (Cederberg Environmental Assessment Practise 2015)

- Botanical assessment of proposed cultivation on farms Laastedrif & Kleinvlakte, Bo Swaarmoed, Ceres (Cederberg Environmental Assessment Practise 2014)
- Botanical assessment of Remainder of Farm Rietfontein 244, Piketberg (Cederberg Environmental Assessment Practise 2014)
- Botanical Assessment of farm Draaihoek 293, Vredendal (Cederberg Environmental Assessment Practise 2013)
- Botanical Assessment of farm Gideonsoord 303, Klawer (Cederberg Environmental Assessment Practise 2013)
- Botanical assessment of proposed agricultural expansion on Remainder of Farm Chilton 160, Piketberg (Cederberg Environmental Assessment Practise 2013)
- Botanical assessment of proposed Namakwa Sands expansion area, Brand se Baai (SRK Consulting 2013)
- Botanical assessment of proposed new N7 alignment near Clanwilliam (CCA Environmental 2013)
- Scoping study of proposed Paleisheuwel Solar PV facility, near Leipoldtville (Sharples Environmental 2012)
- Botanical assessment of Farm 251, Vanrhynsdorp (PPC 2011)
- Botanical scoping study of proposed Wind Energy Facility near Brand se Baai (Savannah Environmental 2010)
- Botanical assessment of a portion of Sandrug farm, Leipoldtville (Footprint Environmental 2010)
- Botanical assessment of a portion of Kookfontein farm, Lambert's Bay (Footprint Environmental 2010)
- Botanical assessment of portion of Swartboskraal farm, Paleisheuwel (Footprint Environmental 2010)
- Botanical assessment of portion of Suurfontein farm, Lambert's Bay (Footprint Environmental 2010)
- Botanical basic assessment of Kruisfontein farm, Redelinghuys (Cederberg Environmental Assessment Practise, 2009)
- Botanical scoping and impact assessment for proposed Eskom Wind Energy Facility near Vredendal (Savannah Environmental, 2007)
- Best practise guidelines for Potato Farming in the Sandveld (CapeNature & Potatoes South Africa 2007)

TABLE OF CONTENTS

1. INTRODUCTION

This botanical assessment was commissioned in order to help inform decisions regarding the application to develop new rooibos tea fields on about 19ha of currently natural vegetation on the farm known as Tweerivier, about 56km south of Nieuwoudtville, in the Northern Cape. The southern boundary of the property is the Doring river.

The three separate study areas are shown in Figure 1. Area 1 is about 7.0ha, area 2 is about 8.7ha, and area 3 is about 3.3ha. The overall property is about 1500ha in extent.

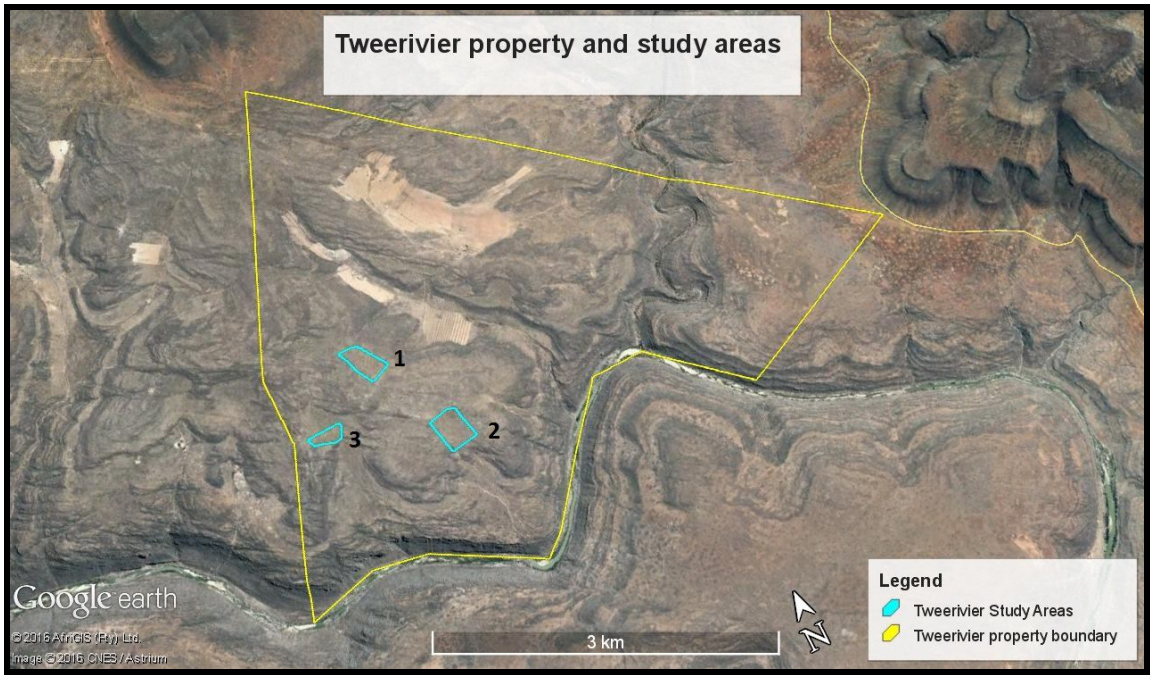

Figure 1: Satellite image showing the three separate study areas, numbered 1-3. The overall property boundary is indicated by the yellow outline.

2. TERMS OF REFERENCE

The terms of reference for this study were as follows:

- undertake a site visit to assess the vegetation on the sites
- compile a botanical report which describes the vegetation in the study area and places it in a regional context, including its status in terms of the CapeNature FineScale Conservation Assessment
- identify and map any plant Species of Conservation Concern in the study area
- map any wetlands in the study area
- provide an overview and map of the ecological conservation significance (sensitivity) of the proposed cultivation and the greater property

- identify likely botanical impacts of the proposed development layout
- assess the significance of the ecological impacts, as per standard Impact Assessment methodology
- provide recommendations in order to minimise the ecological impacts, including discussion of possible conservation tradeoff (offset) areas elsewhere on the greater property.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

The site was visited on 7 September 2016. Although rainfall was well below average this rainy season (May – August) most of the seasonal bulbs and annuals were recorded flowering and were identifiable during the site visit, as were most of the shrubs. Most (but not all) of the potential localised and threatened species in the area can still be identified when not flowering, provided that the observer has experience with the species concerned, and is able to identify sterile or fruiting material. The seasonal constraints on the comprehensiveness of the botanical observations and findings are thus believed to be relatively minor. The confidence levels in the botanical findings are considered to be high, but it should be noted that certain species are always likely to be missed due to the fact that many species are identifiable or evident for only short periods during the year, some of which may be rare or threatened. It is thus possible that some of the areas were assessed as being of lower conservation value/sensitivity than they in fact are.

In order to supplement the species data I used a habitat based approach, in which overall habitat quality, as determined by species richness and presence of key indicator species, is used to determine conservation value – which is a term often used interchangeably (but incorrectly) with “sensitivity”.

During the field visit I walked various transects across the sites, and drove most of the available tracks. I also walked and drove parts of the adjacent natural areas in order to form an opinion on the context and relative importance of the actual study area. During the walks I noted the condition of the veld and habitats, using community structure, species abundance and floristics (species present, notably the Species of Conservation Concern; SCC) as indicators. I recorded all plant species in a notebook, and took various digital photographs and coordinates using a handheld GPS. Certain plant collections were made, which have been turned into voucher specimens and deposited at the Compton Herbarium at Kirstenbosch for future reference, and photos of most of

the SCC are on the website ispot.org.za. The GIS based South African National Biodiversity Institute (SANBI) vegetation map for South Africa (Mucina & Rutherford 2012) was consulted, the Sandveld and Bokkeveld Fine Scale Vegetation Map and Conservation Plan (Helme 2007; Pence 2008), along with the National Spatial Biodiversity Assessment (NSBA; Rouget *et al* 2004), the Western Cape Framework Update (Pence 2012) and the National List of Threatened Ecosystems (DEA 2011). Conclusions were drawn based on this documentation and twenty five years of professional experience in the area and the region.

Google Earth satellite imagery dated February 2016 (and earlier) was used to verify vegetation patterns, and for mapping purposes. Google Earth Pro was used to measure polygon areas.

The No Go alternative is assumed to be a continuation of the *status quo*, *i.e*. no further cultivation of virgin land in the study area, and no heavy grazing or trampling of these areas.

4. STUDY AREA AND REGIONAL CONTEXT

Soils in the study areas are typically sandy soils derived from the underlying sandstone. In all three of the focus areas the sands are generally deep, although in places there are small outcrops of sandstone bedrock, and in some areas (notably in Area 2) this author suspects that that there may be extensive underlying bedrock sandstone at no more than 1m depth. There are no wetlands or drainage areas within any of the study areas.

4.1 National and Regional Context

The site is part of the Northwest Fynbos bioregion (Mucina & Rutherford 2006), and this is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture (typically the biggest habitat threat nationally), urbanisation and alien plants, and

thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing process undertaken is that 67% of the threatened plant species in the country occur only in the southwestern Cape (which for this analysis includes the Bokkeveld), and these total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The study area falls within what is generally known as the Suid Bokkeveld, being part of the greater Bokkeveld region. The Bokkeveld was identified by Raimondo *et al* (2009) and the C.A.P.E. (Cape Action for People and the Environment) project as an area under heavy transformation pressure, primarily from agriculture, and the latter consequently initiated (via CapeNature) a Fine Scale Vegetation Mapping and Conservation Planning project (FSP) in order to identify key conservation priorities in the region (large parts of which are within the Western Cape). The FSP has identified key conservation areas that are needed to meet species, habitat connectivity and process targets in the Bokkeveld and Sandveld – these are known as Critical Biodiversity Areas (CBAs). This was updated for the Hantam Municipality (which includes the study area) in 2012 (Pence 2012), and drew on CapeNature data for this region.

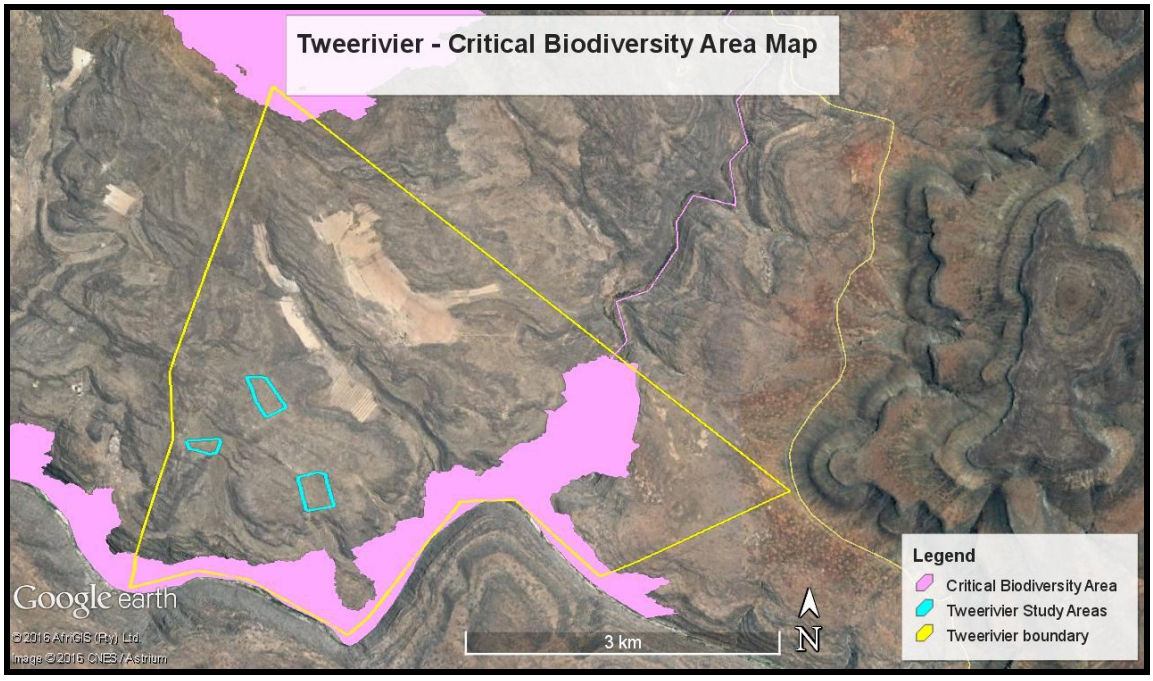

Figure 2: Extract of the Critical Biodiversity Area (CBA) map for the Hantam Municipality (Pence 2012). The mapped terrestrial CBAs are shown in pink shading.

The CBA map for the study area is shown in Figure 2, and it can be seen that none of the three study areas are included as CBAs. Areas on Tweerivier that have been selected as CBAs have been selected for habitat representation, priority subcatchments, edaphic interfaces, focal animal species, and for ecological connectivity value.

5. THE VEGETATION ON SITE

5.1 Background

According to the SA Vegetation map all proposed development areas are within **Doringrivier Quartzite Karoo** (Mucina & Rutherford 2012). This is however very clearly a mistake for the sandy areas (probably caused by this author, as the person responsible for the Bokkeveld fine scale vegetation mapping!), and would obviously be best mapped as **Nardouw Sandstone Fynbos**. Consequently no extract of this vegetation map is included here, as it adds no value.

Nardouw Sandstone Fynbos was only recognised subsequent to drawing up of the national list of threatened habitats and is consequently not listed by DEA (2011). However, Pence (2014) re-assesed this and other habitats in the region for the Western Cape Biodiversity Framework Update, and found that it should be listed as a **Vulnerable** vegetation type (Pence 2014), and this classification is supported and is used in this report.

Fire is an important driver of Fynbos dynamics, and is necessary perhaps once every fifteen to twenty five years in Arid Fynbos vegetation types in order to maintain optimal ecological functioning (Helme 2007, Cadman 2016). The vegetation in the study area is estimated to be at least 35 years old, with no signs of recent fire, and the area is consequently overdue for a fire, with the vegetation showing signs of senescence.

There are various spatial elements of ecological processes on the property, including soil type gradients (ecotones or edaphic interfaces), where loamy sands meet the sandy soils, and small soil moisture gradients. No wetlands are found within or close to the study areas. The study areas currently have good ecological connectivity in all directions.

Trampling and grazing impacts are currently negligible on the sites, and only wild game is present in most areas (*e.g*. grysbok, duiker, porcupine, aardvark), as livestock has

recently been removed from the farm due to problems with predators (Mr Koopman – pers comm.). There is no alien invasive vegetation in the study areas.

5.2. Area 1

The site is slightly east facing, and is a sandy plateau bounded by a small rocky ridge to the west, and a valley to the east. Soils range from deep sands to sandy loams. Exposed bedrock is rare. The vegetation is in very good condition on this site.

Species diversity is high, and appears typical of these habitats in the Suid Bokkeveld.

Plate 1: Overview of Area 1, looking southeast.

Indigenous species present include *Willdenowia incurvata, Thamnochortus platypterus, Ruschia cf carolli, Amphiglossa tomentosa, Phylica rigidifolia, Aristida junciformis, Wahlenbergia* sp4 (undescribed), *Phyllobolus* sp., *Lampranthus pakhuisensis, Gymnodiscus capillaris, Euphorbia rhombifolia, E. tuberosa, E. burmanii, Heliophila pinnata, Chamarea capensis, Lyperia tristis, Adenogramma glomerata, Helichrysum moeserianum, H. dasyanthum, Ursinia anthemoides, U. cakilefolia, Struthiola ciliata, Convolvulus capensis, Ehrharta calycina, Aspalathus heterophylla, Dimorphotheca pluvialis, Cyanella hyacinthoides, Aspalathus cuspidata, Osteospermum monstrosum, Albuca cooperi, Leysera tenella, Muraltia spinosa, Gorteria personata, Lapeirousia fabricii, L. jacquinii, Cleretum bellidiforme, Albuca maxima, Lachenalia hirta, L. uniflora, L. mutabilis, Hermannia trifurca, Trachyandra revoluta, T. paniculata, Chlorophytum undulatum, Hebenstretia repens, Dischisma clandestinum, Ornithoglossum viride, Hymenogyne conica, Rumex cordatus, Oxalis flava, Moraea fugax, Anthospermum*

spathulatum, Felicia dubia, Crassula dichotoma, Pelargonium magenteum, Ornithogalum thyrsoides, Wiborgia leptoptera ssp cederbergensis, Selago sp., Searsia dissecta, Tetragonia spicata, Limeum africanum, Isolepis sp., Pelargonium triste, P. longifolium, Pharnaceum lanatum, Antimima sp., Euclea acutifolia, Gladiolus alatus, Othonna undulosa, Asparagus capensis, Stipagrostis zeyheri, Microloma sagittatum, Nemesia anisocarpa and *Didelta spinosa.*

5.2.1 Species of Conservation Concern

Only one plant Species of Conservation Concern (SCC; previously usually known as Red Data Book listed species; Raimondo *et al* 2009) was recorded from this area, and there is a low - moderate likelihood that others may be present. Redlist status is according to www.redlist.sanbi.org.

Lampranthus pakhuisensis is Redlisted as Data Deficient (Raimondo et al 2009), and is only known from the Suid Bokkeveld and adjacent Pakhuis area, and is fairly common in suitable sandy soils in this fairly small area. About twenty plants are present in the study area, which can be considered as a subpopulation of minor importance. It is threatened primarily by habitat loss associated with rooibos tea cultivation. For a picture of this species see http://www.ispotnature.org/node/833374.

5.3 Area 2

Parts of Area 2 are very similar structurally and floristically to Area 1, but about 60% of the area is heavily dominated by the grass *Aristida junciformis* (steekgras) and the restio *Willdenowia incurvata* (zonkwasriet), and this is likely to be indicative of shallow soils which prevent deeper rooted species from establishing (see foreground of Plate 2). The small shrub *Amphiglossa tomentosa* is also common in most of the area. *Leucadendron pubescens* is absent, but additional species include *Lapeirousia anceps, Lachenalia violacea, Metalasia adunca* and *Asparagus undulatus*.

5.3.1 Species of Conservation Concern

Two plant Species of Conservation Concern were found within this study area, and the likelihood of there being others is deemed to be Low.

Three plants of *Metalasia adunca* (Near Threatened) are present here, and this is regarded as a regionally insignificant subpopulation, and its loss would not be of any

significance, as this a typical Sandveld element, and is very wide ranging, from Hondeklipbaai to Cape Town.

Three plants of the vygie *Lampranthus pakhuisensis* (Data Deficient) were found here, and this is not regarded as a regionally significant subpopulation.

Plate 2: View of Area 2, looking southeast.

5.4 Area 3

This site is southeast facing, and the sands are deeper than Area 2, with less clay component, and there is no exposed bedrock.

Willdenowia incurvata is strongly dominant, with notably less *Thamnochortus platypterus*, and fewer succulents. *Leucadendron pubescens* is quite prominent (Plate 3), and the only additional species recorded was *Wiborgia obcordata*. Overall species composition is fairly similar to that found in Area 1, but tends to be a subset of that, with fewer species overall and more open space.

5.4.1 Plant Species of Conservation Concern

A single plant Species of Conservation Concern was recorded in Area 3, and the likelihood of there being others is deemed to be Low.

One plant of *Metalasia adunca* (Near Threatened) is present here, and this is regarded as a regionally insignificant subpopulation, and its loss would not be of any

significance, as this a typical Sandveld element, and is very wide ranging, from Hondeklipbaai to Cape Town.

Othonna petiolaris (Endangered) is found in the rocky areas just east of the study area, and is quite common in the rockier soils in this region.

Plate 3: View of Area 3, looking southeast over the area.

6. BOTANICAL SENSITIVITY

The terms conservation value and sensitivity are often used interchangeably, but this is not strictly correct. The term “conservation value” refers to the value of the habitat in local and regional conservation terms (*i.e.* answering the question how important is it?), whilst “sensitivity” strictly means how resilient is the habitat to disturbance. In the case of urban or industrial development any natural or partly natural habitat would effectively be permanently lost in the development footprint, and thus technically sensitivity would be high, irrespective of the conservation value of the underlying habitat. The term sensitivity is however simpler and better understood by most and is thus used hereafter in this report.

The botanical sensitivity of a habitat is a product of species diversity, rarity of habitat, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats (ease of rehabilitation). Extensive previous work in the region has allowed the author to make conclusions regarding the overall and relative sensitivity of the vegetation in the study area (see Figure 4).

Areas that have been cultivated or have otherwise been heavily disturbed, have low botanical diversity, and have no regionally important populations of plant Species of Conservation Concern (SCC) are considered to be of Low botanical sensitivity at a regional scale. There are no areas of Low sensitivity in the current study areas.

Areas with a moderate to high indigenous plant diversity and moderate to high structural heterogeneity, and with up to three recorded plant Species of Conservation Concern (SCC), of minor regional significance, are mapped as being of Medium sensitivity. The underlying vegetation type may be regionally threatened.

High sensitivity areas support intact examples of a threatened vegetation type, and usually support significant populations of at least three plant Species of Conservation Concern, and typically support irreplaceable species assemblages or habitats. These areas are often also mapped CBAs (Critical Biodiversity Areas). Note that in some cases even degraded areas may be of High conservation value because of their ecological connectivity value, as they may connect two patches of High conservation value. High sensitivity areas should be considered No Go areas for development. In this study no High sensitivity areas were identified within the study areas.

Very High sensitivity areas have intact vegetation that supports irreplaceable plant populations or communities that are not known to occur elsewhere, or that occur elsewhere in only very low numbers. These areas often also support at least five plant Species of Conservation Concern. Very High sensitivity areas should be considered No Go areas for development. In this study no Very High sensitivity areas were identified.

No botanical sensitivity map is provided as all three study areas are deemed to be of **Medium botanical sensitivity**.

7. IDENTIFICATION OF LIKELY IMPACTS

Any development usually has both direct and indirect impacts on the vegetation and ecology, and this would be the case with the proposed development. Direct impacts usually occur as a result of the construction or development phase, whilst the indirect impacts may occur at this stage but can also take place at the post development (operational) phase. Indirect impacts are often hard to observe and measure, but may

in many cases be more significant than the direct impacts, although this is not usually the case in a partly natural agricultural landscape.

7.1 Construction Phase Impacts

The development of about 19ha of new cultivation would effectively result in the permanent loss of nearly all existing natural vegetation (and most of the associated fauna and ecology) in the development footprint. The vegetation type to be impacted (Nardou Sandstone Fynbos) is regarded as a Vulnerable vegetation type at a regional and national scale (Pence 2014).

The proposed development would not result in the loss of any mapped Critical Biodiversity Areas. The proposed development would result in the loss of the site populations of two different plant Species of Conservation (SCC; *Metalasia adunca* and *Lampranthus pakhuisensis*), but neither of these has a regionally significant population within any of the three development areas. All other direct botanical impacts would be relatively minor in relation to those noted above.

7.2 Operational Phase Impacts

Operational phase impacts will take effect as soon as the natural vegetation on the site is lost, and will persist in perpetuity, or as long as the area is cultivated. Operational phase impacts include loss of ecological connectivity across the sites (minor significance), habitat fragmentation (moderate significance), impact on natural fire regime (moderate significance), reduction in local populations of two threatened species and hence their local viability (of minor significance), and impacts on the associated animal fauna (probably of minor significance for all areas, mainly for invertebrates). All areas are for proposed rooibos tea lands, which are likely to be regularly sprayed with various insecticides and fungicides, and spray drift is likely to have a significant negative impact (even if organic insecticides) on adjacent natural vegetation and fauna (notably the insects, which are key pollinators of many species).

8. IMPACT ASSESSMENT

8.1 Construction Phase Impacts

In the case of this project the primary construction phase impact is loss of natural vegetation within the new development footprint, which totals about 19ha.

For purposes of this assessment it is assumed that about 19ha of new cultivation will be undertaken, and this will be entirely within a Vulnerable vegetation type (Nardou Sandstone Fynbos). All of the areas to be cultivated are of Medium botanical sensitivity.

The site populations of at least 2 plant SCC are likely to be negatively impacted by the proposed cultivation. One of these species *(Lampranthus pakhuisensis)* occurs on site only in Areas 1 and 2, and the other (*Metalasia adunca*) occurs in Areas 2 and 3. Neither of the species have regionally irreplaceable populations within any of the proposed cultivation areas, and the loss will not comprise more than 1% of the total known populations of these species. The only feasible mitigation for these species would be the first step in the mitigation hierarchy – complete avoidance.

It should be noted that no mapped CBAs will be lost within the proposed development footprint.

The loss of the Medium sensitivity vegetation in the three focus areas is likely to be of Low - Medium negative botanical significance, before mitigation. There is little feasible mitigation, other than simply reducing the overall development footprint, that would reduce these impacts to Low negative, but formal conservation of the remaining priority lowland habitat on the property would go some way to reducing the cumulative negative impact, down to perhaps Low to Medium negative.

The magnitude of the impacts will be High (by definition, in that ecological functioning currently present in the proposed development areas will be totally eliminated), duration will be permanent, and extent will be site specific (local). Overall construction phase botanical impacts are thus technically likely to be of High negative significance before mitigation (due to the High magnitude and permanent duration), but Low - Medium negative is more realistic, and possibly Low negative after mitigation.

Primary mitigation is in this case would be formal or informal conservation of the remaining areas of similar deep sandy habitat on the approximately 1500ha property site. There is estimated to be at least 100ha of similar remaining habitat on the property, and possibly as much as 200ha.

Alternative	Extent of impact	Duration of impact	Intensity	Probability of occurrence	Degree of confidence	Significance before mitigation	Significance after mitigation
Focus Areas 1-3 (about 19ha)	Local	Permanent	High	Definite	High	Low - Medium negative	Low negative
No Go alternative	Local	Unknown; possibly temporary	Neutral (but unknown)	High	Medium	Neutral	Not Applicable

Table 1: Impact table for Construction Phase botanical impacts associated with the proposed cultivation and loss of about 19ha of natural vegetation, plus loss of portion of local populations of at least 2 plant Species of Conservation Concern. Primary mitigation would be formal or informal conservation of similar natural vegetation elsewhere on the 1500ha property.

8.2 Operational Phase Impacts

The most obvious operational phase impact is likely to be increased habitat fragmentation and loss of current terrestrial ecological connectivity across the cultivated parts of the focus areas. The overall intensity of this change is likely to be low in a regional context, as no CBAs will be lost, and no obvious ecological corridors will be severed or interrupted, primarily because here is still extensive natural habitat on all sides of all three study areas.

Pesticide spray drift (especially under windy conditions often prevalent during spraying) into the adjacent natural veld is known to have a significant negative effect on the natural insect life and consequently on the pollination and seed set of various plants (Knight *et al* 2005; Pretorius 2010), and is thus likely to be an issue on most of the edges of the new development. Although its magnitude is very difficult to assess it is likely to be relatively low, at least in the areas more than 10m from the cultivated edges.

High value standing crops such as rooibos fields obviously need to be protected from wildfires, and thus the adjacent areas of natural vegetation often also get protected from wildfire. This is likely to be a factor on this site, as the surrounding natural vegetation is both fire prone and largely fire dependant (Helme 2007; Cadman 2016). The conversion of large parts of the Bokkeveld escarpment from livestock grazing

(when fire was used as a grazing management tool) to rooibos cultivation (active fire suppression) is in fact a major problem in terms of the negative impact on natural fire regimes (Helme 2007), and at least 70% of this region is now well overdue for a fire, with many areas not having been burnt for more than fifty years (pers. obs). Natural, optimal fire cycles in this area are likely to be in the order of once every 20 – 25 years. The negative impact on surrounding fire regimes is thus likely to be one of the more significant negative botanical impacts, and is likely to be Medium negative.

The loss of the site populations of the two recorded plant Species of Conservation concern is not likely to have a major negative impact on the metapopulations, especially if the remaining natural areas on the greater property are conserved, as these areas support large populations of all these (and other) species.

Alternative	**Extent of impact**	**Duration of impact**	**Intensity**	**Probability of occurrence**	**Degree of confidence**	**Significance before mitigation**	**Significance after mitigation**
4 Development Areas (19ha)	Local	Permanent (at least for duration of cultivation)	Medium	Very likely	Medium - High	Medium negative	Low - Medium negative
No Go alternative	Local	Unknown; probably temporary	Very Low (but unknown)	Low	Medium	Neutral	Not Applicable

Table 2: Impact table for combined Operational Phase botanical impacts associated with the three proposed cultivation areas. Impacts include habitat fragmentation, pesticide drift and disruption of natural fire regimes. Mitigation includes conservation of the remaining natural vegetation on the property.

The conservation of at least three times the total development area of currently natural vegetation on the property could be viewed as a positive impact that takes place over the operational phase of the project as well, and in this regard it helps to reduce the negative operational phase impacts.

Overall, combined, operational phase botanical impacts are likely to be of Medium negative significance before mitigation, and Low – Medium negative after mitigation.

8.3 The No Go Alternative

The No Go alternative usually implies the continuation of the status quo. In this case there would thus be no expansion of agriculture into currently natural vegetation (that would total about 19ha). There is currently no livestock on the property, so grazing is not a factor. There is small wild game, and the landowner could, without any further permission, use the area for grazing, which may degrade the natural vegetation and habitat on site, but this is likely to have a marginal impact. The property however, has a low carrying capacity and this landuse would not generate any significant income. And given the general lack of compliance by landowners in many regions (pers. obs.) there is always the real possibility of illegal cultivation, without any form of authorisation or mitigation, notwithstanding the threat of a fine of up to R5m.

On balance however, the No Go scenario (assuming no illegal cultivation) is likely to have no more than a Neutral botanical and ecological impact.

8.4 Cumulative Impacts

The cumulative botanical impacts of the proposed development are understood to be broadly equivalent to the regional botanical impacts, in that the vegetation type to be impacted by the proposed development has been, and will continue to be, impacted by numerous agricultural developments and other factors (the cumulative impacts) within the region. Agricultural expansion is by far the most important factor causing habitat loss in the region (Raimondo et al 2009), and there is currently something of a boom in the fruit and rooibos producing areas, and the author is currently involved with assessment of at least 800ha of new lands in this region, which is in itself a significant cumulative impact.

Because the development footprint is only 19ha, and significant natural vegetation remains on the greater property, the overall cumulative botanical impact of the proposed development is Low - Medium negative before mitigation, and Low – Medium negative after mitigation.

9. REQUIRED MITIGATION

- All bush clearing must be restricted to the 19ha shown in Figure 1.

10. CONCLUSIONS AND RECOMMENDATIONS

- The proposed total extent of new cultivation on this property (in three areas) is about 19ha, as shown in Figure 1.
- All proposed development areas are within Nardou Sandstone Fynbos, which is considered a Vulnerable vegetation type at a national and regional level (Pence 2014).
- Only two threatened plant species (*Metalasia adunca* and *Lampranthus pakhuisensis*) were recorded in any numbers within the proposed development areas, and the loss of the site populations of these species will not be regionally significant.
- All mitigation outlined in Section 9 is considered reasonable and feasible, and is factored into the assessment, and is thus considered to be essential and mandatory. It is assumed that all mitigation proposed will be effectively and timeously implemented.
- Overall construction phase botanical impacts of the proposed 19ha development is considered to be an acceptable Low - Medium negative before mitigation. With the proposed mitigation this could be reduced to an even more acceptable Low negative.
- Overall operational phase botanical impacts of the proposed 19ha development is considered to be an acceptable Medium negative before mitigation. With the proposed mitigation this could be reduced to an even more acceptable Low – Medium negative.
- A Search and Rescue program for the many plants within the development areas was considered, but none of the translocatable species known to occur on the development areas are so rare that they really need to be translocated, and secondly translocation itself would further disturb the receiving areas, and thus no program has been recommended. All translocatable species within the development areas are also well represented in the remaining natural areas on the greater property.
- Given that the development will be in a fire prone and fire dependant ecosystem, and that the area is well overdue for a fire, consideration should be given to undertaking a few controlled burns on the property prior to

development. This will require specialist input and management, but would be very beneficial for biodiversity in the long term, and would also substantially reduce the ever increasing risk of a runaway wildfire, by reducing the available fuel load for a period of at least ten years after the fire.

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APPENDIX E – Public Participation Report

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3 October 2016

The Municipal Manager
Hantam Municipality
Calvinia, 8190

Attention Municipal Manager

PROPOSED ESTABLISHMENT OF 19HA ROOIBOS CULTIVATED LANDS,

TWEERIVIER, FARM 958/0 NIEUWOUDTVILLE,
DENC Ref No. NC/BA/22/NAM/HAM/NIE1/2016

Notice is given of a Public Participation Process in terms of the Environmental Assessment Regulation 41(2) van GN No. R.982 of 4 December 2014, promulgated under National Environmental Management Act (NEMA), Act 107 of 1998 as amended. **The Public Participation and commenting period** will start on the **10th October** for the prescribed 30 days and will end on the **11th November 2016.** An electronic copy of the Draft Basic Assessment Report is attached for your attention.

Listed Activities: Environmental authorization is required for listed activities as specified in Notice 1 (GN. No. R. 983) (Dec 2014), specifically for:

Activity 17 - The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-
(i) the undertaking of a linear activity; or
(ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Locality: Tweeriviere, Farm 958/0, Nieuwoudtville, may be reached by travelling in a southern direction from Nieuwoudtville. Turn right at the Papkuilsfontein turn off and the gate to Tweeriviere will be on your right after traveling 56 kilometres from Nieuwoudtville. The farmstead is located at GPS Point - 31°53'08.73" and 19°08'51.51".

Applicant: Department of Agriculture, Land Reform and Rural Development.

Environmental Assessment Practitioner: FOOTPRINT Environmental Services.

Regards

K.S Ranger

C.P du Plessis

PROPOSED ESTABLISHMENT OF 19 HECTARES OF ROOIBOS CULTIVATION LANDS ON TWEERIVIER, FARM 958/0 NIEUWOUDTVILLE,

HANTAM LOCAL MUNICIPALITY, NAMAKWA DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE

DENC REF NR NC/BA/22/NAM/HAM/NIE1/2016

Group	Organisation / Department	Title	Initials	Surname	Postal	Town	Code	Contact number
Authorities	Hantam Municipality	The Municipal Manager			Private bag X 14	Calvinia	8190	municipalmanager@hantam.gov.za
Authorities	Hantam Municipality	The ward councillor - Nieuwoudtville			Private bag X 14	Calvinia	8190	municipalmanager@hantam.gov.za
Authorities	Namakwa District Municipality	The Municipal Manager			PO Box 20	Springbok	8240	info@namakwa-dm.gov.za
Authorities	Department of Agriculture	Mr	L	October	PO Box 18	Springbok	8240	loctober@ncpg.gov.za
Authorities	Department of Water and sanitation	Mr	A	Abrahams	28 Central Road, Beaconsfield	Kimberley	8301	AbrahamsA@dwa.gov.za or Abe@dwa.gov.za
Authorities	Department of Environmental Affairs and Nature Conservation		Onwabile	Ndzumo	Private Bag X 16	Springbok	8240	onyndzumo@gmail.com
Authorities	National Department of Agriculture, Forestry and Fisheries. Land-use and Soil Management		Rahab	Maboa	Private Bag X2,	Sanlamhof	7532	RahabM@daff.gov.za
Neighbour	Tweefontein	Mr	J	Kotze	P.O.Box 148	Clanwilliam	8135	
Neighbour	Landskloof	MS	D	Koopman	Po Box 47	Nieuwoudtville	8180	
Neighbour	Jaagvlak	Mr	Tom	Ludick	PO Box 417	Clanwilliam	8135	
NGO	Heiveld Co-operative Ltd	The CEO			PO Box 154	Nieuwoudtville	8180	
NGO	Environmental Monitoring Group	Mr	N	Oettle	1 Neethlingh St	Nieuwoudtville	8180	

AGTERGROND DOKUMENT

VOORGESTELDE VESTIGING VAN 19 HEKTAAR ROOIBOS TEE LANDERYE OP TWEERIVIER, PLAAS 958/0 NIEUWOUDTVILLE

DEPT: O&NB VERWYSING NR: NC/BA/22/NAM/HAM/NIE1/2016

Aansoeker : Departement van Landbou, Grondhervorming en Landelike Ontwikkeling

Projek ligging: Die voorgestelde vestiging van nuwe Rooibostee lande word beplan vir Tweerivier, Plaas 958/0, Nieuwoudtville (GPS 31º53'08.73"en 19º08'51.51") - koördinate is geneem bly die plaashuis. Dié eiendom word bereik deur in 'n suidelike rigting te ry uit Nieuwoudtville en regs te draai by die Papkuilsfontein afdraai, na 56 kilometer sal die Tweerivier afraai na regs wees.

Projek beskrywing: Die aansoeker versoek magtiging om 19 hektaar natuurlike plantegroei te verwyder en te ontwikkel as landerye waarop rooibostee verbou kan word. Die areas sal teen die bestaande windrigting gevestig word om wind erosie te verminder. Stroke van 10m natuurlike plantegroei gaan ook gelaat word ten einde die beweging van natuurlike biota te verseker. 'n Grondanalise studie is reeds onderneem wat die geskiktheid van die area bevestig. Die ontwikkeling poog om finansiële volhoubaarheid van die eienaar te verseker in 'n bedryf wat gekenmerk word deur jaarlikse mark fluktuasies. Die Nieuwoudtville Plato is een van die vernaamste Rooibos produserende areas in die streek.

Kennis vir publieke deelname proses word gegee in terme van die Omgewingsimpak Regulasie 42(2) van Goewerment Kennisgewings (GK) No. 982 van 4 Desember 2014, gepromulgeer deur die Wet op Nasionale Omgewingsbestuur (WNOB) (Wet No. 107 van 1998) (soos gewysig).

Gelyste Aktiwiteite: Die beplande ontwikkeling van die rooibostee lande op Tweerivier is onderworpe aan 'n Basiese Omvangsbepaling Proses. Aansoek word gedoen vir Gelyste Notering 1 van Goewerment Kennisgewing (GK No R. 983) en spesifiek Aktiwiteit 17

Publieke deelname proses

'n Konsep Basiese Omvangsbepaling Verslag sal beskikbaar wees by die Hantam Munisipaliteit kantoor op Nieuwoudtville vanaf 10 Oktober 2016.

Kennisgewing word aan sleutelrolspelers gestuur: 3 Oktober 2016

Aanvanklike registrasie en kommentaar: 10 Oktober 2016 – 11 November 2016.

Finale Basiese Omvangsbepaling Verslag: Sal aan DENC voorsien vir omgewingsmagtiging.

Omgewingsmagtiging: FES sal die besluit rakende omgewingsmagtiging binne 12 dae kommunikeer aan al die geregistreerde partye ten einde vir rolspelers in staat te stel om te appelleer.

Uitnodiging om kommentaar te lewer

Alle Geïnteresseerde en Geaffekteerde Partye word vriendelik versoek om kommentaar te lewer oor die voorgestelde ontwikkeling of om kwessies te identifiseer wat u in die verslag wil laat aanspreek. Dui ook asseblief aan van enige direkte sake-, finansiële, persoonlike of ander belang wat u in die aansoek mag hê.

Verwys ten alle tye na **DEPT: O&NB VERWYSING NR: NC/BA/22/NAM/HAM/NIE1/2016**

FOOTPRINT Environmental Services (FES) is aangestel as die Onafhanklike Omgewingsbepalings Praktisyn vir die ontwikkeling en u is welkom om ons te kontak..

Kommentaar en lewering van insette: 10 Oktober 2016 – 11 November 2016.

FOOTPRINT Environmental Services (FES)

KONTAKBESONDERHEDE : FES, Posbus 454, Porterville, 6810. charlduplessis2@afrihost.co.za. 079 17 24340 en 086 608 8304 (Faks)

BACKGROUND INFORMATION DOCUMENT

PROPOSED ESTABLISHMENT OF 19HA ROOIBOS CULTIVATED LANDS ON TWEERIVIER, FARM 958/0 NIEUWOUDTVILLE,

DENC Ref Nr. NC/BA/22/NAM/HAM/NIE1/2016

Applicant : Department of Agriculture, Land reform and Rural Development

Project location: The proposed establishment of the Rooibos cultivated lands is panned for Tweerivier, Farm 958/0, Nieuwoudtville (GPS 31°53'08.73" and 19°08'51.51") – coordinated was taken at the farmstead. The property can be reached travelling in a southern direction from Nieuwoudtville. Turn right at the Papkuilsfontein turn off and the gate to Tweerivier will be on your right after traveling 56 kilometres from Nieuwoudtville.

Project description: The applicant wishes to clear 19 hectares indigenous vegetation to establish Rooibos Tea. The cultivated areas will be against the prevailing wind direction in order to mitigate the impact of wind erosion. Strips of natural vegetation of at least 10m will be left in order to allow for the movement of natural biota. A soil analyses report has been completed for the sites and indicated that the soil is suitability for Rooibos production. This application will ensure financial sustainability of the landowner in a market that is characterized by significant volatility in price year on year. The Nieuwoudtville Plateau is recognized as one of the best Rooibos tea production areas within the natural distribution area of Rooibos.

Notice is given of a Public Participation Process in terms of the Environmental Assessment Regulation 42(2) of GN No R. 982 of 4 December 2014, promulgated under National Environmental Management Act (NEMA), Act 107 of 1998 as amended.

Listed Activities: The proposed Rooibos tea development requires the undertaking of a Basic Assessment (BA) Process. Environmental authorization is required for listed activities as specified in Notice 1 (GN. No. R. 983) (Dec 2014), specifically for activity 17.

Public Participation Process:

Draft Basic Assessment Report: Will be available at the Hantam Municipal Offices at Nieuwoudtville from the 10th October 2016.

Notification of the proposed development: 3rd October 2016

Initial registration as Interested and Affected Parties and commenting period: 10th October 2016 – 11th October (30days).

Basic Assessment Report: Will be submitted to DENC for the Environmental Authorisation (EA) process.

EA: FES will circulate the decision of the application to all Registered I&AP (within twelve days).

Appeal: Opportunity for registered I&AP's to appeal the decision will be communicated to all registered I&AP's.

Invitation to provide comments for the proposed development

Interested and Affected Parties (I&AP) are hereby requested to provide the following information to FOOTPRINT Environmental Services: Name, Surname, Postal Address, Tel no., Cell no., e-mail address and please also indicate your chosen means of communication with the EAP's. Please indicate any interest you may have in the project either direct business, financial and personal or any other interest in the proposed development. We require this information for inclusion in the I&AP's database and Public Participation Report.

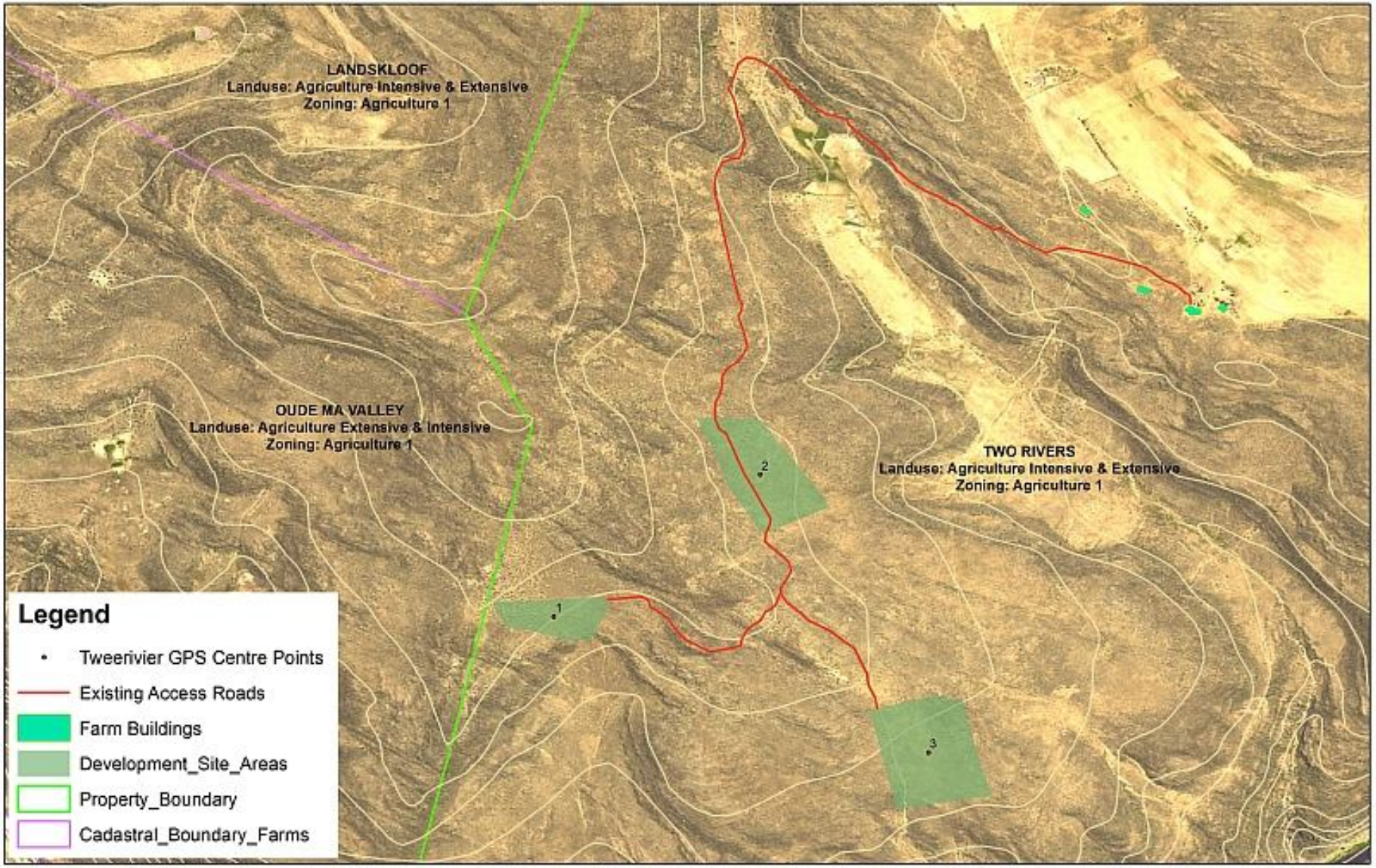
Always refer to - DENC Ref Nr. NC/BA/22/NAM/HAM/NIE1/2016

Commenting timeframe: 10th October 2016 – 11th November 2016.

FOOTPRINT Environmental Services (FES) has been appointed by the applicant as the independent Environmental Assessment Practitioners (EAP) to undertake the Basic Assessment Process.

CONTACT DETAILS: FES, PO BOX 454, Porterville, 6810. charlduplessis2@afrihost.co.za. 079 17 24340 (Cell) and 086 608 8304 (Fax)

Tweeriviere
Site Map & Neighbouring Properties



NOTIFICATION

PROPOSED ESTABLISHMENT 19HA ROOIBOS CULTIVATED LANDS,

TWEERIVIER, PLAAS 958/0 NIEUWOUDTVILLE,

DENC Ref Nr. NC/BA/22/NAM/HAM/NIE1/2016

KENNISGEWING

VOORGESTELDE VESTIGING VAN 19 HEKTAAR ROOIBOS TEE LANDERYE
TWEERIVIER, PLAAS 958/0 NIEUWOUDTVILLE
DEPT: O&NB VERWYSING NR: NC/BA/22/NAM/HAM/NIE1/2016

Indien u enige kommentaar het en wil registreer as 'n Geïnteresseerde en Geaffekteerde Party, voltooi asseblief die vorm en stuur terug aan ***FOOTPRINT Environmental Services voor of op 11 November 2016.***

Should you have any comments and/or would like to register as ad Interested and Affected Party ("I&AP"), please complete this Form and return to ***FOOTPRINT Environmental Services by the 11th November 2016.***

Kontakbesonderhede / Contact details:

Posbus / PO Box 454, Porterville, 6810; 086 6088304 (faks / fax); e-pos / e-mail charlduplessis2@afrihost.co.za

Titel en Naam (Title and Name)	
Adres (Address)	
Tel en Faks (Tel and Fax)	
Sel (Cell)	
E-pos (E-Mail)	

U KOMMENTAAR / YOUR COMMENTS

1. Die volgende kwessies moet aangespreek word in die verslag / The following issues should be addressed in the report.

2. Die volgende kommentaar word gelewer / The following comments are made.

3. Enige persoonlike, besigheid, finansiele of ander belange by die aansoek / Any personal, business, financial or other interests regarding this application.

DANKIE VIR U DEELNAME / THANK YOU FOR YOUR PARTICIPATION

APPENDIX F – Impact Assessment

(a) Impacts that may result from the planning, design and construction phase

Potential impacts on geographical and physical aspects:	
Nature of impact:	Low - Disturbance of the soil in the strips that will be cultivated. The soils are unstructured (Sandy) and may be lost to wind and weather.
Extent and duration of impact:	Limited to the clearing and initial cropping period and thereafter to the production cycle after the lands have been left fallow.
Probability of occurrence:	100%
Degree to which the impact can be reversed:	There is a high degree of probability that the impact can be reversed due to the fact that this is an indigenous crop and as such well adapted to the soils within the area. Therefore it is desirable for the soils to remain in their natural state. Furthermore in the production practice it is common for producers to leave strips of natural vegetation between production rows of Rooibos to serve as windbreaks. If these strips are >10m wide edge effects on the natural vegetation are to a great extent mitigated. The result is that these strips can serve as source areas of species for recolonisation of the disturbed area and the restoration of diversity in the medium to long term. The organic content and soils nutrient cycling could be restored.
Degree to which the impact may cause irreplaceable loss of resources:	Low - The cleared strips will cause no irreplaceable loss of the sandy substrate. If good production practices are followed and cover crops established loss of soil resulting from wind erosion should be well controlled.
Cumulative impact prior to mitigation:	Low - Cumulative impacts associated with this proposed development would primarily revolve around the maintenance of natural soil chemistry through the use of fertilisers that may alter soil pH. As stated above the Rooibos plant is adapted to acidic soils and it is therefore desirable for the producer to maintain natural soil pH and chemistry.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Degree to which the impact can be mitigated:	High
Proposed mitigation:	Establishment of post harvest cover crops and the judicial use of organic fertilisers to ensure the maintenance of near natural to natural soil chemistry. Those areas where the geology is near the surface will be avoided. Avoid areas with steep slopes.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential impact on biological aspects:	
Nature of impact:	The removal of natural vegetation and the disturbance of soil micro fauna and flora communities. The presence of people in the lands could carry with it the potential for increased fire risk and more frequent fires that could undermine diversity.
Extent and duration of impact:	Limited to the clearing and initial cropping period and thereafter to the production cycle after the lands have been left fallow. The second is an ongoing concern that could happen at any time without adequate management.
Probability of occurrence:	100% for clearing and difficult to supply probability for uncontrolled fire.
Degree to which the impact can be reversed:	There is a high degree of probability that the impact can be reversed due to the fact that this is an indigenous crop and as such well adapted to the soils within the area. Therefore it is desirable for the soils to remain in their natural state. Furthermore in the production practice it is common for producers to leave strips of natural vegetation between production rows of Rooibos to serve as windbreaks. If these strips are >10m wide edge effects on the natural vegetation are to a great extent mitigated. The result is that these strips can serve as source areas of species for recolonisation of the disturbed area and the restoration of diversity in the medium to long term. There is a good chance therefore that the present terrestrial plant and animal diversity may be restored if the production of Rooibos was to cease for some reason. Ecological functioning at these small scales such as

	pollination services should be maintained through the retention of the natural strips of vegetation and by virtue of the fact that there are very extensive tracts of natural veld in the surrounding landscape, thus ensuring the propagation of seed from the resident plant communities. The natural vegetation is fire adapted and if left undisturbed for two years after the fire should recover.
Degree to which the impact may cause irreplaceable loss of resources:	Medium to low – Following the precautionary principle, little is known of the long term effects of a cropping system such as this, however anecdotal evidence seems to indicate that diversity within a strip >10m remains high in this vegetation type. As such one would expect the ecology associated with the healthy functioning ecosystem to be retained by dint of the retained diversity in the plant community. With fires only if too frequent will they result in permanent loss of biodiversity.
Cumulative impact prior to mitigation:	Medium – Cumulative impacts would be associated with the movement of machinery and people into the area during the initial phase of clearing, through to the establishment of the crop and husbandry of the crop, during the fallow period the impacts of grazing by small stock. With fires only if too frequent will they result in permanent loss of biodiversity.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	Impacts on cleared vegetation cannot be mitigated and this resource will be lost. The creation of >10m strips of natural vegetation does mitigate the impact significantly and in an instance where production is discontinued should allow near natural recovery over time. The physical impacts on remaining vegetation can be well controlled through active management guidelines that restrict vehicles and people to cultivated areas and reduce edge impacts on the natural strips and along access roads. Frequent fires from staff in the lands smoking or cooking can be mitigated through effective management.
Proposed mitigation:	As stated above avoidance of the clearing of extant vegetation is not possible and it will be lost. Effective management of the remaining strips through preventing people from entering them unnecessarily and adhering to best practice when using biocides in field should maintain

	enough diversity to provide a source area for natural rehabilitation of cultivated areas in the event that agricultural production is discontinued. Under no circumstances should vehicles be allowed to cross over these strips of natural vegetation. Access routes to the production area should be similarly managed. Management of small stock should be controlled to ensure that the natural strips are not trampled or over utilised. Having stock in these areas over winter to keep palatable forbes in control and the lack of palatable plants in the natural strips should mitigate impacts from small stock. Fire can be used selectively in controlled burns to rejuvenate senescent vegetation, however expert opinion should be sought before these controlled burns are carried out preferably through the Greater Cederberg Fire Protection Association. Uncontrolled burns should be mitigated through active management of staff and clear guidelines regarding smoking and the making of cooking fires when in the lands.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential impacts on socio-economic aspects:	
Nature of impact:	Temporary employment to clear and scatter cleared natural vegetation. Income and improved standard of living for rural unskilled people.
Extent and duration of impact:	For the period when the clearing and preparation of the new production areas is undertaken
Probability of occurrence:	100%
Degree to which the impact can be reversed:	If approved these services will be required and are therefore highly irreversible.
Degree to which the impact may cause irreplaceable loss of resources:	N/A
Cumulative impact prior to mitigation:	Medium - Cumulative Impacts would be associated with the greater number of people being temporarily employed over the period of time it would take to clear the authorised area.

	The relationship between the landowner and temporary staff willing to work could result in longer term temporary employment opportunities.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	N/A the projected benefit would be a positive contribution to rural poor livelihoods. Mitigation of the potential effects of increased income into poor households falls within the realms social welfare and well outside the scope of this assessment.
Proposed mitigation:	N/A
Cumulative impact post mitigation:	Medium
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium

Potential impacts on cultural-historical aspects:	None expected please refer to Appendix D – Specialist Reports (Heritage)
Nature of impact:	None
Extent and duration of impact:	None
Probability of occurrence:	None
Degree to which the impact can be reversed:	None
Degree to which the impact may cause irreplaceable loss of resources:	None
Cumulative impact prior to mitigation:	None
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	None
Degree to which the impact can be mitigated:	None
Proposed mitigation:	None
Cumulative impact post mitigation:	None

Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	None

Potential noise impacts:	
Nature of impact:	Associated with the presence of agricultural machinery and the presence of people in the lands.
Extent and duration of impact:	Ongoing as long as the business remains a viable concern.
Probability of occurrence:	100%
Degree to which the impact can be reversed:	None
Degree to which the impact may cause irreplaceable loss of resources:	None envisioned this is not an area that has conservation areas and / or wilderness areas, the loss of a sense of wilderness is not applicable here. Noise impacts in this remote agricultural community would be generic across most properties.
Cumulative impact prior to mitigation:	None required
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	None required
Proposed mitigation:	None required
Cumulative impact post mitigation:	None required
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential visual impacts:	
Nature of impact:	The removal of natural vegetation and its replacement by Rooibos tea lands.
Extent and duration of impact:	Permanent
Probability of occurrence:	100%

Degree to which the impact can be reversed:	High - the fact that natural vegetation remains in the production area allows for a ready source of volunteer plants to recolonise the strips that were cleared, ample evidence of the resilience of the natural vegetation to recolonise is evident, the basic structure dominated by restio's colonises first the balance of the diversity will take longer. The fact that soil chemistry remains near natural aids the recovery of these lands significantly.
Degree to which the impact may cause irreplaceable loss of resources:	Low – On the pretext that good management of the remaining natural areas is ensured. No irreplaceable loss of visual resources should occur in the event that the farming operation should cease.
Cumulative impact prior to mitigation:	Low – this is an area that is characterised by extensive cultivation of Rooibos and the visual impact of this proposed development would not alter the general look of the surrounding agricultural lands. The general practice of leaving natural strips in the production area is a well established practice and automatically mitigates impact.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low – because of existing production practices.
Degree to which the impact can be mitigated:	Medium-High – The natural strips in the cultivated area is an effective mitigation measure versus clearing. However the lands of Rooibos are clearly evident hence the lower rating here. The flat to undulating topography means that most of the landscape is visible from any vantage point making the use of topography difficult to use as a mitigatory measure. In any event this is well away from any recognised tourist route being traversed by visitors who may find an agricultural landscape offensive.
Proposed mitigation:	Strip cultivation where the windrows of natural vegetation should be >10m wide.
Cumulative impact post mitigation:	Low – for the reasons mentioned above
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

(b) Impacts that may result from the operational phase.

Potential impacts on the geographical and physical aspects:	
Nature of impact:	Low - Disturbance of the soil in the strips that will be cultivated. Loss of soil from the production areas due to erosion - the soils are unstructured sand.
Extent and duration of impact:	Limited to the initial cropping period and thereafter to the production cycle after the lands have been left fallow. Additionally operational impacts may be related to the use of the area for grazing.
Probability of occurrence:	100%
Degree to which the impact can be reversed:	There is a high degree of probability that the impact can be reversed due to the fact that this is an indigenous crop and as such well adapted to the soils within the area. Therefore it is desirable for the soils to remain in their natural state. Furthermore in the production practice it is common for producers to leave strips of natural vegetation between production rows of Rooibos to serve as windbreaks. If these strips are >10m wide edge effects on the natural vegetation are to a great extent mitigated. The result is that these strips can serve as source areas of species for recolonisation of the disturbed area and the restoration of diversity in the medium to long term. The organic content and soils nutrient cycling could be restored.
Degree to which the impact may cause irreplaceable loss of resources:	Low - The cleared strips will cause no irreplaceable loss of the sandy substrate. If good production practices are followed and cover crops established loss of soil resulting from wind erosion should be well controlled.
Cumulative impact prior to mitigation:	Low - Cumulative impacts associated with this proposed development would primarily revolve around the maintenance of natural soil chemistry through the use of fertilisers that may alter soil pH. As stated above the Rooibos plant is adapted to acidic soils and it is therefore desirable for the producer to maintain natural soil pH and chemistry.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Degree to which the impact can be mitigated:	High
Proposed mitigation:	Establishment of post harvest cover crops and the judicial use of organic fertilisers to ensure the maintenance of near natural to natural sol chemistry.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential impact biological aspects:	
Nature of impact:	The disturbance of natural vegetation along field boundaries and the disturbance of soil micro fauna and flora communities. The increased fire risk from the presence of people in the lands and more frequent fires that could undermine diversity.
Extent and duration of impact:	Limited to the clearing and initial cropping period and thereafter to the production cycle after the fallow rotation. The second is an ongoing concern that could happen at any time without adequate management.
Probability of occurrence:	100% for edge effect impacts, which cannot be avoided, the risk of fire is difficult to estimate for uncontrolled fire.
Degree to which the impact can be reversed:	High - There is a high degree of probability that the impact can be reversed due to the fact that this is an indigenous crop that is well adapted to the soils within the area, the soils should remain in their natural state. Furthermore the retention of strips of natural vegetation between production rows of Rooibos to serve as windbreaks are a ready and available source of species to colonise areas that may be impacted by disturbance along the edges if these strips are >10m wide. There is a good chance therefore that the present terrestrial plant and animal diversity may be restored if the production of Rooibos was to cease for some reason and to colonise smaller areas that may accidentally be impacted during the production cycle. Ecological functioning at these small scales such as pollination services should be maintained through the retention of the natural strips of vegetation, thus ensuring the propagation of seed from the resident plant communities. The

	natural vegetation is fire adapted and if left undisturbed for two years after the fire should recover well.
Degree to which the impact may cause irreplaceable loss of resources:	Medium to low – Following the precautionary principle, little is known of the long term effects of a cropping system such as this, however anecdotal evidence seems to indicate that diversity within a strip >10m remains high in this vegetation type. As such one would expect the ecology associated with the healthy functioning ecosystem to be retained by dint of the retained diversity in the plant community within the production area. The irreplaceable loss of biodiversity should therefore be avoided. Frequent uncontrolled fires however may result in the permanent loss of biodiversity at local to regional scales.
Cumulative impact prior to mitigation:	Medium to Low – Cumulative impacts would be associated with the movement of machinery and people into the area during the initial phase of clearing, through to the establishment of the crop and husbandry of the crop, during the fallow period the impacts of grazing by small stock. With fires only if too frequent will they result in permanent loss of biodiversity.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium to Low
Degree to which the impact can be mitigated:	The creation of >10m strips of natural vegetation does mitigate the impact significantly and in an instance where production is discontinued should allow near natural recovery over time. The physical impacts on remaining vegetation can be well controlled through active management guidelines that restrict vehicles and people to cultivated areas and reduce edge impacts on the natural strips and along access roads. Frequent fires from staff in the lands smoking or cooking can be mitigated through effective management.
Proposed mitigation:	Effective management of the remaining strips through preventing people from entering them unnecessarily and adhering to best practice when using biocides in field should maintain enough diversity to provide a source area for natural rehabilitation of cultivated areas in the event that agricultural production is discontinued. Under no circumstances should vehicles be allowed to cross over these strips of natural vegetation. Access routes to the production area should be

	similarly managed. Management of small stock should be controlled to ensure that the natural strips are not trampled or over utilised. Having stock in these areas over winter to keep palatable forbes in control and the lack of palatable plants in the natural strips should mitigate impacts from small stock. Fire can be used selectively in controlled burns to rejuvenate senescent vegetation, however expert opinion should be sought before these controlled burns are carried out preferably through the Greater Cederberg Fire Protection Association. Uncontrolled burns should be mitigated through active management of staff and clear guidelines regarding smoking and the making of cooking fires when in the lands. These issues should be captured and dealt with in more detail in the EMP.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential impacts on the socio-economic aspects:	
Nature of impact:	More probability for the agricultural business to remain economically sustainable. Assurance of current employment opportunities and through expansion of the business the need to have greater numbers of temporary staff during harvest thus seasonal work for the currently unemployed in the low skilled job segment.
Extent and duration of impact:	Ongoing – the success of the business should support current employees in perpetuity and the increased annual production volume should supply annual seasonal harvest employment opportunities.
Probability of occurrence:	High – This farm is a successful ongoing concern its success should continue under the guidance of a skilful farmer and capacitated staff that have worked for the business for many years.
Degree to which the impact can be reversed:	Low – This would require a reversal of local and international market demand which is possible but for a health product such as this unlikely in our opinion. Climate change is howeer

	a factor that may cause the impact to be reversed, however local scale understanding of the impact of climate change is at present unavailable and too unreliable to hazard a guess at the degree to which it may impact on agri-business at this scale. In any event there are numerous phenotypes of Rooibos that have evolved in widely different situations and climatic conditions throughout its relatively broad distribution range, future genetic stock from this population may supply opportunities to breed drought resistant plants in an event where the Western Cape does get drier and hotter in response to elevated CO_2 level as coarser scale models for climate change on the West Coast appear to indicate.
Degree to which the impact may cause irreplaceable loss of resources:	If this remains a successful farming operation the impact on human capital should remain positive. It potential failure would not result in the loss of this capital more likely its migration with the capacity gained to another business.
Cumulative impact prior to mitigation:	N/A the projected benefit would be a positive contribution to rural poor livelihoods. This project is aimed at increasing income into poor households.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be mitigated:	N/A the projected benefit would be a positive contribution to rural poor livelihoods. This project is aimed at increasing income into poor households.
Proposed mitigation:	None
Cumulative impact post mitigation:	N/A the projected benefit would be a positive contribution to rural poor livelihoods. This project is aimed at increasing income into poor households.
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium

Potential impacts on the cultural-historical aspects:	Please refer to Appendix D – Specialist Reports (Heritage)
Nature of impact:	None

Extent and duration of impact:	None
Probability of occurrence:	None
Degree to which the impact can be reversed:	None
Degree to which the impact may cause irreplaceable loss of resources:	None
Cumulative impact prior to mitigation:	None
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	None
Degree to which the impact can be mitigated:	None
Proposed mitigation:	None
Cumulative impact post mitigation:	None
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	None

Potential noise impacts:	
Nature of impact:	Associated with the presence of agricultural machinery and the presence of people in the field during the growth and harvest periods of the crop.
Extent and duration of impact:	Ongoing as long as the business remains a viable concern.
Probability of occurrence:	100%
Degree to which the impact can be reversed:	None
Degree to which the impact may cause irreplaceable loss of resources:	None envisioned this is not an area that has conservation areas and / or wilderness areas, the loss of a sense of wilderness is not applicable here. Noise impacts in this remote agricultural community within a landscape with which this development shares an affinity would be generic across most properties.
Cumulative impact prior to mitigation:	None
Significance rating of impact prior to mitigation	Low

(Low, Medium, Medium-High, High, or Very-High)	
Degree to which the impact can be mitigated:	None required
Proposed mitigation:	None required
Cumulative impact post mitigation:	None required
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential visual impacts:	
Nature of impact:	The visual impact of cleared agricultural lands.
Extent and duration of impact:	Permanent as long as the production system remains a viable economic concern.
Probability of occurrence:	100%
Degree to which the impact can be reversed:	High - the fact that natural vegetation remains in the production area allows for a ready source of volunteer plants to recolonise the strips that were cleared, ample evidence of the resilience of the natural vegetation to recolonise is evident, the basic structure dominated by restio's colonises first the balance of the diversity will take longer. The fact that soil chemistry remains near natural aids the recovery of these lands significantly.
Degree to which the impact may cause irreplaceable loss of resources:	Low – On the pretext that good management of the remaining natural areas is ensured. No irreplaceable loss of visual resources should occur in the event that the farming operation should cease.
Cumulative impact prior to mitigation:	Low – this is an area that is characterised by extensive cultivation of Rooibos and the visual impact of this proposed development would not alter the general look of the surrounding agricultural rural landscape. The general practice of leaving natural strips in the production area is a well established practice and automatically mitigates impact.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-	Low – because of existing production practices.

High)	
Degree to which the impact can be mitigated:	Medium-High – The natural strips in the cultivated area is an effective mitigation measure versus clearing. However the lands of Rooibos are clearly evident hence the lower rating here. The flat to undulating topography means that most of the landscape is visible from any vantage point making the use of topography to conceal agricultural fields difficult to use as a mitigatory measure. In any event this is well away from any recognised tourist route being traversed by visitors who may find an agricultural landscape offensive.
Proposed mitigation:	Strip cultivation where the windrows of natural vegetation should be >10m wide.
Cumulative impact post mitigation:	Low – for the reasons mentioned above
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

(c) Impacts that may result from the decommissioning and closure phase.

NB: It must be noted here that no plans exist to decommission this development, if well managed and in an instance where the market for the product remains this operation has the potential to remain operation for the foreseeable future.

Potential impacts on the geographical and physical aspects:	
Nature of impact:	Low – The cessation of agricultural activity would allow the natural vegetation to re-establish.
Extent and duration of impact:	Ongoing following a natural succession of species to re-establish a more complex and diverse community.
Probability of occurrence:	High in the event that the remaining strips of natural vegetation and the surrounding areas that remain natural are well managed.
Degree to which the impact can be reversed:	Low- in a management situation where natural vegetation communities are well managed.
Degree to which the impact may cause	None – this is a restorative effort and the impact is therefore

irreplaceable loss of resources:	positive.
Cumulative impact prior to mitigation:	High - This would be scale related - the greater the area decommissioned the more of a source community would be available to recolonise and rehabilitate the disturbed areas. Mitigating the cumulative impact would be counter productive.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	N/A
Degree to which the impact can be mitigated:	N/A
Proposed mitigation:	N/A
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	N/A

Potential impact biological aspects:	
Nature of impact:	Restoration of the natural ecosystem that occupied the transformed areas prior to the creation of the agricultural system
Extent and duration of impact:	Ongoing
Probability of occurrence:	High due to the availability of a source in close proximity to the field boundary and within the fields themselves.
Degree to which the impact can be reversed:	Positive impact for which reversal would be counter productive.
Degree to which the impact may cause irreplaceable loss of resources:	Positive environmental impact thus not applicable.
Cumulative impact prior to mitigation:	N/A
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	N/A
Degree to which the impact can be mitigated:	N/A

Proposed mitigation:	N/A
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential impacts on the socio-economic aspects:	
Nature of impact:	Loss of employment opportunities to unskilled rural poor
Extent and duration of impact:	Permanent in an instance where the activity is decommissioned.
Probability of occurrence:	Low – Market indicators are strong and the area is well suited to this agricultural activity.
Degree to which the impact can be reversed:	0% in the case of full scale decommissioning.
Degree to which the impact may cause irreplaceable loss of resources:	If a generic trend this could result in a migration of labour to other areas and an increasing scarcity of labour available to remaining producers, but these thoughts are speculative and in the area of conjecture.
Cumulative impact prior to mitigation:	Decommissioning of entire productive landscapes with the associated economy.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	Through the consolidation of the market, environmental best practice for the production system, effective and well capacitated extension to farmers, best practice in terms of employment and social standards for labour on farms.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

Potential impacts on the cultural-historical aspects:	
Nature of impact:	NONE
Extent and duration of impact:	NONE
Probability of occurrence:	NONE
Degree to which the impact can be reversed:	NONE
Degree to which the impact may cause irreplaceable loss of resources:	NONE
Cumulative impact prior to mitigation:	NONE
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE
Degree to which the impact can be mitigated:	NONE
Proposed mitigation:	NONE
Cumulative impact post mitigation:	NONE
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE

Potential noise impacts:	
Nature of impact:	NONE
Extent and duration of impact:	NONE
Probability of occurrence:	NONE
Degree to which the impact can be reversed:	NONE
Degree to which the impact may cause irreplaceable loss of resources:	NONE
Cumulative impact prior to mitigation:	NONE
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-	NONE

High)	
Degree to which the impact can be mitigated:	NONE
Proposed mitigation:	NONE
Cumulative impact post mitigation:	NONE
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE

Potential visual impacts:	
Nature of impact:	NONE – Assuming that the pre-development natural landscape is restored
Extent and duration of impact:	NONE
Probability of occurrence:	NONE
Degree to which the impact can be reversed:	NONE
Degree to which the impact may cause irreplaceable loss of resources:	NONE
Cumulative impact prior to mitigation:	NONE
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE
Degree to which the impact can be mitigated:	NONE
Proposed mitigation:	NONE
Cumulative impact post mitigation:	NONE
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE

(d) Any other impacts:

Potential impact:	NONE

Nature of impact:	NONE
Extent and duration of impact:	NONE
Probability of occurrence:	NONE
Degree to which the impact can be reversed:	NONE
Degree to which the impact may cause irreplaceable loss of resources:	NONE
Cumulative impact prior to mitigation:	NONE
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE
Degree to which the impact can be mitigated:	NONE
Proposed mitigation:	NONE
Cumulative impact post mitigation:	NONE
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	NONE

APPENDIX G – Environmental Management Programme

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APPENDIX G

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

PROPOSED 19 HECTARE ROOIBOS TEA DEVELOPMENT,TWEERIVIERE, FARM 958/0 NIEUWOUDTVILLE ` `

(DENC REFERENCE NR NC/BA/22/NAM/HAM/NIE1/2016)

THE CLIENT

Northern Cape Department of Agriculture, Land Reform and Rural Development

OCTOBER 2016

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v) Abbreviations

BA	Basic Assessment
CBA	Critical Biodiversity Area
DENC	Department of Environmental Affairs and Nature Conservation
EA	Environmental Authorization
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
FES	FOOTPRINT Environmental Services
GPS	Global Positioning System
GIS	Global Information System
IEM	Integrated Environmental Management
NEMA	The National Environmental Management Act No 107 of 1998 as amended.
NID	Notice of Intend to Develop
OESA	Other ecological Support Areas
PPP	Public Participation Process
RoD	Record of Decision

SECTION A: OVERVIEW OF THE PROJECT

1. Introduction

A Basic Assessment is currently being undertaken on Tweeriviere, Farm 958/0 Nieuwoudtville (Northern Cape) by the Northern Cape Department of Agriculture, Land Reform and Rural Development to assess the significance of impacts and determine the cost benefit and feasibility of a 19 hectare Rooibos Tea development. The SG digit code for the cadastre is C01500000000095800000 and the site is located at GPS coordinates 31º53'08.73"(latitude) and 19º08'51.51"(longitude) (GPS points at the farmstead). **See Map 1 – Locality Map.**

The landowner, Mrs Katrina Koopman wishes to expand her dryland and organic Rooibos Tea *(Aspalathus linearis*) production capacity with another 19hectares. The express aim is to addressing economies of scale and ensuring financial sustainability in a market that is characterized by significant volatility in price year on year. She is part of the Rooibos emerging farmers Ilima Letsema development project – funded and supported by Government.

The Nieuwoudtville Plateau is recognized as one of the best Rooibos tea production areas within the natural distribution area of Rooibos. The demand and markets for organic Rooibos tea has been on a significant upward trend for decades but is characterised by price volatility. To deal with market volatility requires that a production concern is able to produce on a large enough scale to take advantage of the good years but also to be able to keep the business afloat on smaller profit margins by ensuring that enough volume is delivered to absorb losses of lower prices.

The primary driver of the upward trend in market size has been the significant growth in sophisticated international markets concerned with healthier and more responsible living. Rooibos has health benefits primarily due to the high levels of anti-oxidants which make it very popular in these types of markets. The product is sold in a bewilderingly varied number of products but the bulk of the produce is sold as fermented Rooibos, flavored fermented tea and unfermented ("Green") Rooibos. The products is also sold in herbal blends, iced tea, skincare products and toiletries.

The proposed development will entail the clearance of natural vegetation (19ha) for the preparation of the Rooibos Cultivated lands on the areas identified by a soil survey undertaken by BVi Consulting Engineers in 2015. Natural indigenous vegetation strips (>10m) will remains within the production areas however there is no need for additional agricultural infrastructure by way of dams, soil drainage, irrigation and electricity systems – the entire proposed development and operational phase after Environmental Authorization will be based be based on organic conditions and adherence to certification standards and protocols.

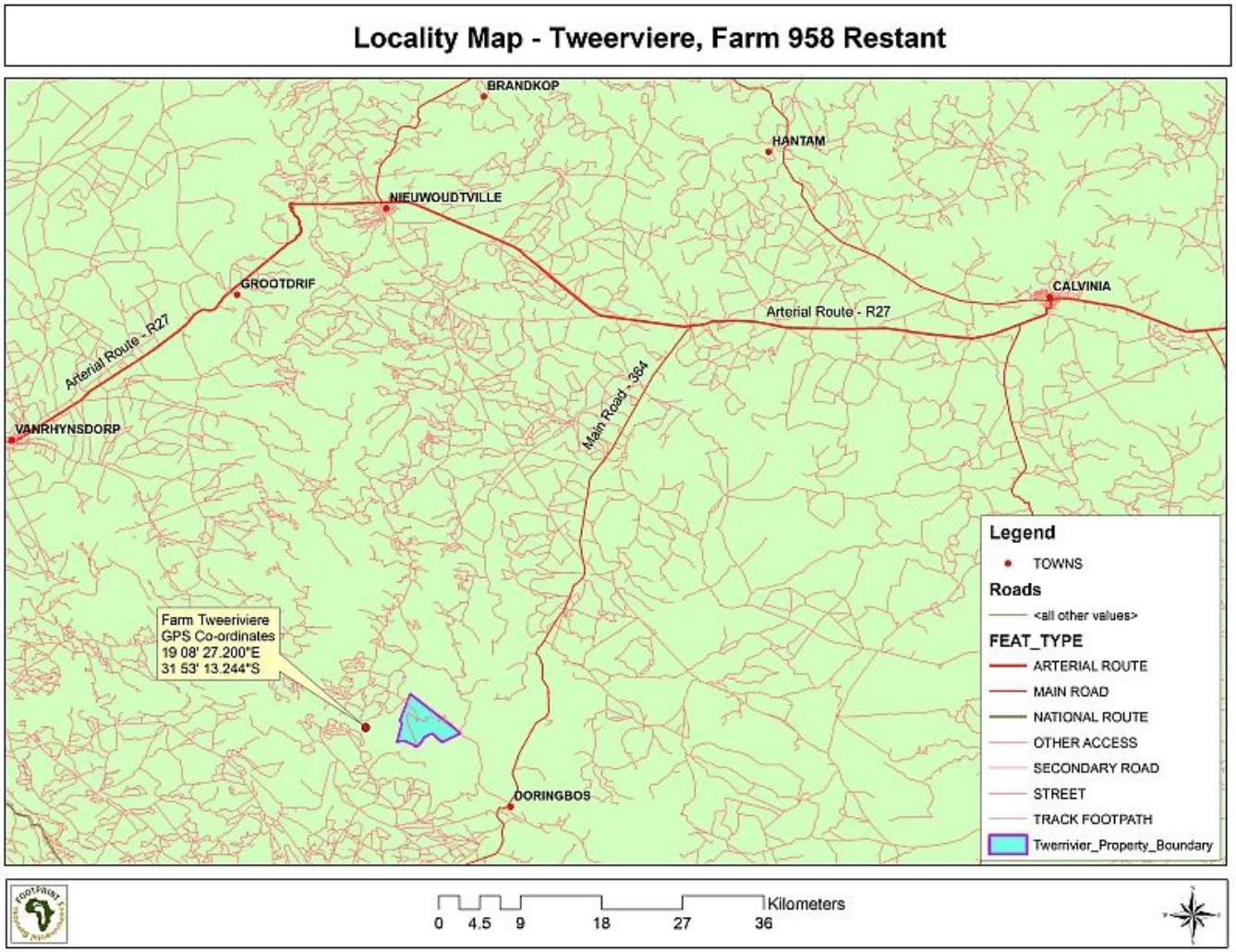
FOOTPRINT Environmental Services (Registered as Cederberg Conservation Services CC – 2009/056651/23) was appointed by Northern Cape Department of Agriculture, Land Reform and Rural as independent Environmental Assessment Practitioners to undertake the Basic Assessment in accordance with the requirements of NEMA; Act No. 107 of 1998 and the 2014 Regulations.

2. Key components of the proposed development

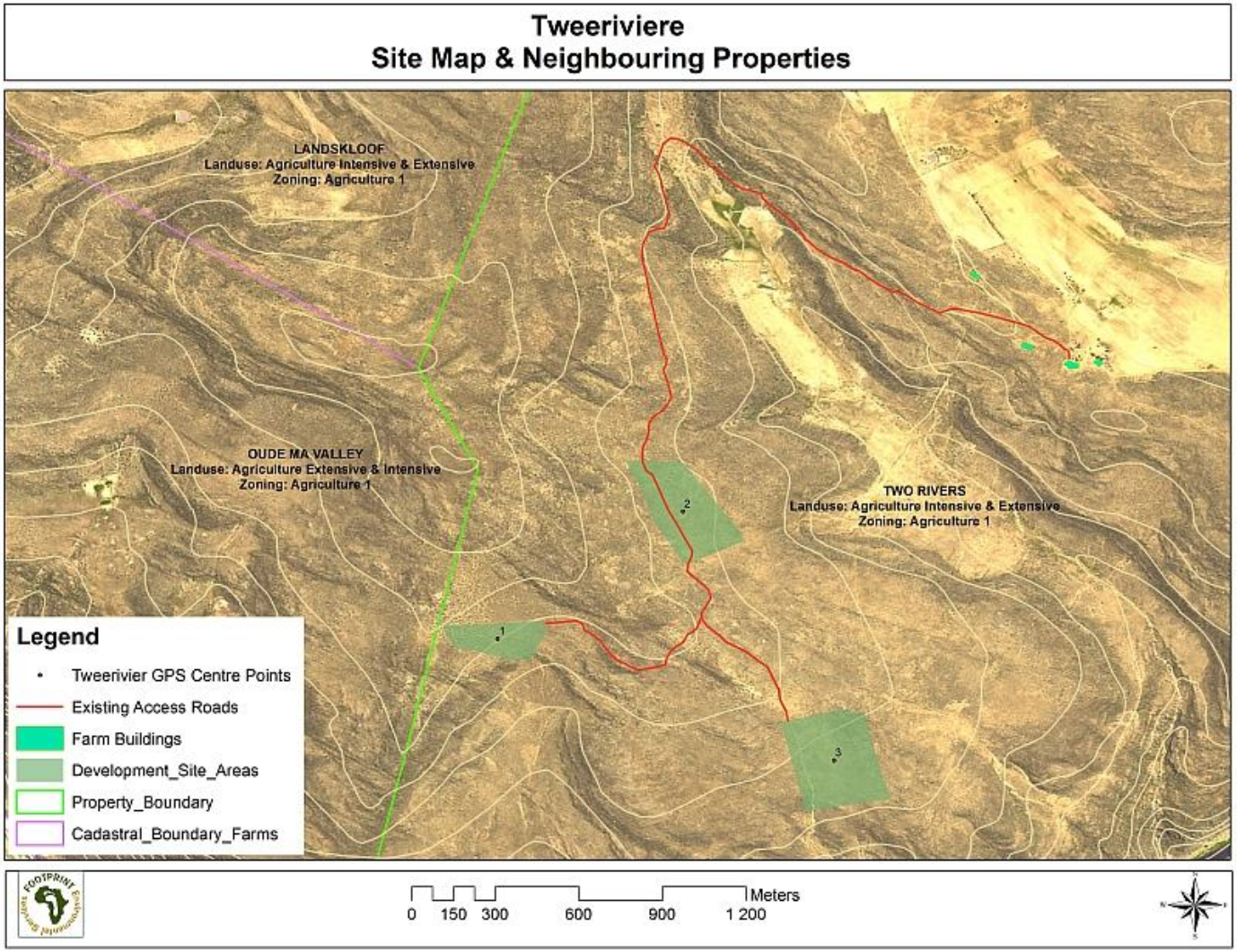
The proposed development will have the following key components / phases and this EMPr describes these in depth.

- *Institutional Arrangements – this describes the various roles and responsibilities of key stakeholders (Project Proponent; the Environmental Control Officer; Project Manager (landowner in this instance), provides administrative and legislative processes and protocols on how the development should unfold;*
- *Planning and design of the cultivated lands – this have been done through a soil investigation study conducted by BVi Consulting Engineers – however aspects such the identification and mapping of 'no go" areas and the development of method statements still needs to be undertaken;*
- *The development phase - describes activities to ensure that the owner and the staff become more environmentally sensitive through training and awareness sessions. It also describes how their impacts during the clearance phase can be mitigated for aspects such as the development footprint, faunal species, soils and the substrate, heritages resources and visual values. All these activities and impacts should be monitored and evaluated in order to ensure compliance.*
- *The operational phase - will focus on aspects such as the minimisation of wind erosion, the management of natural strips and adherence to certification protocol and guidelines.*
- *The decommissioning phase - must comply with the South African labour legislation at that future date.*

Map 1 : Locality map – Tweeriviere, Farm 958/0



Map 2 : Site Development Plan – Tweeriviere – Rooibos Tea Development



3. Findings of the Basic Assessment Report

Table 1 – Summarise the key findings of the Basic Assessment Report

3.1 Planning, design and development phase	
Aspect	Description of impacts
Impacts on geographical and physical environment	Extend of the impact is limited to the clearing and initial cropping period and thereafter to the production cycle after the lands have been left fallow. There is a high degree of probability that the impact can be reversed due to the fact that Rooibos is an indigenous crop and as such are well adapted to the soils within the area.
Impacts on biological features	The development of about 19ha of new cultivation would effectively result in the permanent loss of nearly all existing natural vegetation (and most of the associated fauna and ecology) in the development footprint. The vegetation type to be impacted (Nardou Sandstone Fynbos) is regarded as a Vulnerable vegetation type at a regional and national scale (Pence 2014). The proposed development would not result in the loss of any mapped Critical Biodiversity Areas. The proposed development would result in the loss of the site populations of two different plant Species of Conservation (SCC; *Metalasia adunca* and *Lampranthus pakhuisensis*), but neither of these has a regionally significant population within any of the three development areas. All other direct botanical impacts would be relatively minor in relation to those noted above (Helme 2016). Furthermore in the production practice it is common for producers to leave strips of natural vegetation between production rows of Rooibos to serve as windbreaks. If these strips are >10m wide edge effects on the natural vegetation are to a great extent mitigated.
Socio-economic impacts	Temporary employment to clear and scatter cleared natural vegetation will improve income and standard of living for rural unskilled people. Cumulative Impacts would be associated with the greater number of people being temporarily employed over the period of time it would take to clear the authorised area. The relationship between the landowner and temporary staff willing to work could result in longer term temporary employment opportunities. However in the long term this development would ensure that the landowner manage the property as a sustainable business.

Impacts on Heritage Resources	No cultural resources are evident on these sites
Visual Impacts	Visual Impacts relate to impacts on sensitive receptors in the foreground and middle ground. The removal of natural vegetation and its replacement by Rooibos tea lands will have a visual impact but Rooibos cultivated areas are a general landscape feature in the region. The general practice of leaving natural strips (>10m) in the production area is a well-established practice and automatically mitigates impact
Noise Impacts	Noise impacts will be associated with the presence of agricultural machinery and the presence of people in the lands. This will only be relevant during the clearing and planting season and then when transporting the cut tea to the Co-ops.
3.2 Impacts during the operational phase	
Geographical and physical aspects	There is a high degree of probability that the impact can be reversed due to the fact that Rooibos is an indigenous crop and as such well adapted to the soils within the area. Therefore it is desirable for the soils to remain in their natural state. Furthermore in the production practice it is common for producers to leave strips of natural vegetation between production rows of Rooibos to serve as windbreaks. If these strips are >10m wide edge effects on the natural vegetation are to a great extent mitigated. The result is that these strips can serve as source areas of species for recolonisation of the disturbed area and the restoration of diversity in the medium to long term. The organic content and soils nutrient cycling could be restored.
Impacts on biological resources	Operational phase impacts will take effect as soon as the natural vegetation on the site is lost, and will persist in perpetuity, or as long as the area is cultivated. Operational phase impacts include loss of ecological connectivity across the sites (minor significance), habitat fragmentation (moderate significance), impact on natural fire regime (moderate significance), reduction in local populations of two threatened species and hence their local viability (of minor significance), and impacts on the associated animal fauna (probably of minor significance for all areas, mainly for invertebrates). All areas are for proposed rooibos tea lands,

	which are likely to be regularly sprayed with various insecticides and fungicides, and spray drift is likely to have a significant negative impact (even if organic insecticides) on adjacent natural vegetation and fauna (notably the insects, which are key pollinators of many species
Socio-economic impacts	More probability for the agricultural business to remain economically sustainable. Assurance of current employment opportunities and through expansion of the business the need to have greater numbers of temporary staff during harvest thus seasonal work for the currently unemployed in the low skilled job segment
Impacts on Heritage Resources	None
Visual impacts	Visual Impacts relate to impacts on sensitive receptors in the foreground and middle ground. On the pretext that good management of the remaining natural areas is ensured. No irreplaceable loss of visual resources should occur in the event that the farming operation should cease.
Noise impacts	Associated with the presence of agricultural machinery and the presence of people in the field during the growth and harvest periods of the crop. Noise impacts in this remote agricultural community within a landscape with which this development shares an affinity would be generic across most properties.
3.3 Impacts during the decommissioning phase	
Geographical and physical aspects	This impact would be low – The cessation of agricultural activity would allow the natural vegetation to re-establish.
Impacts on biological resources	Restoration of the natural ecosystem that occupied the transformed areas prior to the creation of the agricultural system will be positive.
Socio-economic impacts	Would result in a negative impact as it will negatively influence employment opportunities to unskilled rural poor. If this were to become a generic trend then this could result in a migration of labour to other areas and an increasing scarcity of labour available to remaining producers, but these thoughts are speculative and in the area of conjecture

Impacts on Heritage Resources	None
Visual Impacts	None – as the area will be restored to its natural condition – however this could be slow.

SECTION B : PURPOSE, LEGAL REQUIREMENTS, STRUCTURE OF THE EMP

4. Purpose of the EMPr

The EMPr has been included as part of the Environmental Impact Assessment Report (EIAR) to provide a link between the impacts identified in the Environmental Impact Assessment (EIA) process and the actual environmental management on the property during project planning, construction, operation and decommissioning.

5. Legal requirements

In accordance with Section 24N of NEMA (as amended) the Northern Cape Department of Environmental and Nature Conservation, requires the submission of an EMPr. The contents of the EMPr must meet the requirements outlined in Section 24N (2) and (3) of NEMA (as amended) and Appendix 4 of the NEMA EIA Regulations, 2014. The EMPr must address the potential environmental impacts of the proposed activity on the environment throughout the project life cycle including an assessment of the effectiveness of monitoring and management arrangements after implementation.

The Department requires that the EMPr be submitted together with the EIAR so that it can be considered simultaneously.

Table 2: Section 24N (2) and (3) of the NEMA (as amended) listing the requirements of an EMPr

24N.(2) the environmental management programme must contain-
(a) information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of –
- (i) planning and design;
- (ii) pre-construction and construction activities;
- (iii) the operation or undertaking of the activity in question;
- (vi) the rehabilitation of the environment; and
- (vii) closure, where relevant.

(b) details of –
- (i) the person who prepared the environmental management programme; and
- (ii) the expertise of that person to prepare an environmental management programme

(c) a detailed description of the aspects of the activity that are covered by the draft environmental management plan;
(d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);

(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance.
(f) as far as is reasonable practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and
(g) a description of the manner in which it intends to-

(i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) remedy the cause of pollution or degradation and mitigation of pollutants; and
(iii) comply with any prescribed environmental management standards or practices.

(3) the environmental management programme must , where appropriate-
(a) set out time periods within which the measures contemplated in the environmental management programme must be implemented;
(b) contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of prospecting or mining operations or related mining activities which may occur inside and outside the boundaries of the prospecting area or mining area in question; and
(c) develop an environmental awareness plan describing the manner in which-
(i) the applicant intends to inform his or her employees of any environmental risk which may result . from their work; and
(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.

Table 3 : Appendix 4 of the NEMA EIA Regulations (2014), listing the follow requirements for a EMPr

According to Appendix 4, the contents of an environmental management programme must contain the following information;
(a) details of –

(i) the EAP who prepared the EMPr; and
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;

(b) a detail description of the aspects of the activity that are covered by the EMPr as identified by the project description;
(c) a map at a appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitiveness of the preferred site, indicating any areas that should be avoided, including buffers;
(d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified trough the environmental impact assessment process for all phases of the development including -

(i) planning and design;
(ii) pre-construction activities
(iii) construction activities;
(iv) rehabilitation of the environment after construction and where applicable post closure'
(v) operation activities;

(e) a description of impact management outcomes required for the aspects contemplated in paragraph (2);

(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraph (d) and (e) will be achieved, and must, where applicable, include actions to-

(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) comply with any prescribed environmental management standards or practices;
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation; where applicable;

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(i) an identification of the persons who will be responsible for the implementation of the impact management actions;
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
(k) the mechanisms for monitoring compliance with the impact management actions contemplated in paragraph (f);
(l) a program for reporting on compliance, taking into account the requirements as prescribe by the Regulations;
(m) an environmental awareness plan describing the manner in which—

(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment;

(n) any specific information that may be required by the competent authority;measures contemplated in paragraph (b);

6. Structure of the EMPr

As mentioned above the EMPr aims to address environmental management throughout the entire project cycle, from planning, development/construction, operation and decommissioning. The EMPr for the proposed Rooibos Tea cultivated lands is structured in the following way:

- *Project overview;*
- *Purpose, legal requirements, structure of the EMP'r;*
- *Institutional arrangements;*
- *Planning and design;*
- *Social responsibility programme;*
- *Development phase;*

- *Operation phase and decommissioning*

7. Expertise of Environmental Assessment Practitioners

Section 24N (2) and (3) of NEMA (as amended) and Appendix 4 of the NEMA EIA Regulations, 2014 requires that an Environmental Management Programme must include the details of the person(s) who prepared the EMPr, and the expertise of that person to prepare an EMPr. In this regard, the *Curriculum Vitae* of the Environmental Assessment Practitioners who compiled this EMPr are included in **Appendix 1**.

Other Specialist used in compiling this Draft Environmental Impact Assessment Report;

Name of the company	Specialist	Report
BVi Consulting Engineers	M. Pretorius	Soil study – to determine soil suitability
Nick Helme Botanical Surveys	Helme Nick	Botanical assessment of proposed new cultivation of Rooibos Tea on Tweeriviere, Farm, Suid Bokkeveld, Northern Cape.
ACRM	Jonathan Kaplan	Heritage Impact Assessment, proposed cultivation of Rooibos Tea on Farm 958, Tweeriviere, Nieuwoudtville, Hantam Municipality, Northern Cape.

See Appendix D – Specialist reports in the Basic Assessment Report

SECTION C : INSTITUTIONAL ARRANGEMENTS

This EMP'r, once approved by the competent authority, DENC, should be seen as binding to the Applicant and any person acting on the Applicant's behalf, including but not limited to agents, employees, associates, contractors and service providers. The Applicant and all other persons who may be directly involved in the development are also bound by their general Duty of Care, as stated in Section 28 of the National Environmental Management Act, 1998:

Duty of Care

"Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment"

This section describes the role and the responsibilities of the key stakeholders that are involved in the development, the implementation and review of the EMPr.

8. Roles and responsibilities

8.1 Project proponent

The Northern Cape Department of Agriculture, Land Reform and Rural Development, the project proponent, is responsible for the implementation of the EMPr and must ensure that conditions of the Environmental Authorisation (EA) are implemented and that these documents are included in all contracts with service providers. Where activities and tasks are undertaken by workers and / or contractors the project proponent remains liable for non-compliance. Therefore the project proponent is responsible for liaising with the relevant authorities in the preparation and implementation of the EMPr and meeting the conditions of the EA.

The EA is only **valid for 3 years** and the development must commence within this timeframe. If the project does not commence within this time period the holder must lodge an application for the amendment of the valid EA. Such an application will be made to extend the timeline for commencement. The application must be lodged before the expiry date of the current EA.

The Project proponent must appoint an Environmental Control Officer (ECO) for the entire project to ensure that the recommendations of the EA are adhered to. The Environmental Control Officer (**ECO**) must have a degree / diploma in environmental management from a recognised South African University or Technicon, with a minimum of two years' experience in the field of Environmental Management and specifically as an environmental site officer.

8.2 Environmental Control Officer

It is recommended that an Environmental Control Officer (**ECO**) is appointed for the entire duration of the project with the following duties and responsibilities.

- Site inspection at regular intervals to evaluate compliance with the EA and conditions of the EMPr;
- Completion and submission of audit reports to the Project Proponent on implementation and non-compliance of the EA and EMPr (See Appendix 2 – Environmental audit);
- Take the necessary action to ensure compliance with the requirements of the EMPr at all times;
- Attend site meetings (when needed) with the Project Proponent to report, discuss and review performance in the implementation of the EMPr, this to be a standing point on the monthly meeting agenda;
- Communicate and provide information regarding the implementation of the EMPr with the workers / contractor when needed;
- Maintain a register of the dates and times and discussion with project team and various specialists when on site;
- Communicate all aspects of the EMPr to the site staff prior to commencement of any activity that has the potential to cause environmental impact;
- Provide basic environmental awareness training
- Undertake a final audit of the site on completion of the project and submit a report to DEA&DP as per conditions of the EA.
- Must complete the following reports and records (a) site instructions, (b) emergency preparedness and response procedures, (c) incident reports, (d) training records, (e) site inspection reports, (f) work procedures, (g) monitoring reports, (h) auditing reports and (i) complaints received. These records should be kept for at least two years after completion of the project.

8.3 Project Manager

Although the Project Manager **(PM),** in this case the landowner, is responsible for the coordination of various activities during the clearing phase, she must also perform key duties to implement the EMPr. The PM must delegate the implementation of the EMPr to the staff to ensure compliance and must monitor performance from info received from the Environmental Control Officer's monthly reports.

The PM shall be responsible for ensuring that all activities on site are undertaken in accordance with the environmental provisions detailed in this EMPr and the EA – and must ensure that staff are duly informed of their roles and responsibilities in this regard.

The PM and staff have a duty to demonstrate respect and care for the environment in which they are operating and will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with any environmental regulations.

9. Administration

9.1 Location of the EMPr

This EMPr will be a dynamic document and once approved by DENC, may change over time when more information becomes available. However, any substantial changes will be communicated to DENC for acceptance before any such changes are implemented. A copy of the EMPr will be available at the property at all times.

9.2 Site Meetings

The ECO shall attend the progress and/or site meetings on a monthly basis to provide feedback on any outstanding or contentious environmental issues. The ECO must ensure that environmental issues are a standing point on the agenda during these meetings and must keep records of these meetings.

9.3 Failure to comply with the Environmental Considerations

This EMPr shall be binding on all the parties involved in this development and shall be enforceable at all levels within the project. Work shall at all times be approached with due concern to the conservation of the

local natural environment. Management and site procedures shall be directed towards minimising environmental impact and / or damage in all aspects of the work.

The ECO may order the Project Proponent and or the Project Manager to suspend part or all of the work if the contractors / workers cause damage to the environment by not adhering to the conditions and specifications set. The suspension will be enforced until such time as the offending parties' actions, procedure and/or equipment are corrected.

Failure to show adequate consideration to the environmental aspects of the EMPr as well as the conditions of approval by DENC will result in the suspension of all work until such time as the offending actions or procedures are corrected. No extension of time will be granted for such delays and all costs will be borne by the project proponent.

Please see Appendix 5 – Fines and penalties.

SECTION D : PLANNING AND DESIGN

10. Planning and design of the cultivated lands

BVi Consulting Engineers completed a soil investigation survey to ascertain its suitability for the cultivation production of Rooibos Tea at Tweeriviere. Three sites were identified on the property that are suitable for Rooibos tea production (BVi 2016). **See Appendix D – Specialist reports in the Basic Assessment Report.**

The contractor and the ECO must planned, map and establish the site establishment process using the following criteria;

- *Take environmental sensitivity into consideration (See BAR);*
- *Identify and map all the cultivated areas as well as the strips to be remained.*
- *Natural strips should be no go areas – and should be clearly mark*
- *Identify areas where cut vegetation will be placed;*
- *Compile a waste management strategy that focus on waste reduction, re-use and recycling and*
- *Identify and implement activities that focus on the minimisation of the development footprint;*

11. "No go" areas

The areas outside the development footprint and the natural vegetation strips will be no go areas. These areas must be clearly identified and demarcated.

12. Method statements

Method statements which are a written submission by the Contractor in response to an environmental specification / request by the Project Manager set out a plan, materials, labour and methods that the Contractor will use to complete a specific activity.

Specific areas that will need method statements are;

- *The site establishment process and plan;*
- *Site preparation plan;*
- *Management of strips;*
- *Fire prevention;*

SECTION E : SOCIAL RESPONSIBILITY PROGRAMME

13. Local employment

The PM, the landowner in this instance, must ensure that opportunities and benefits associated with the establishment of the cultivated lands will create local employment (women should get preference) and will improve capacity building – this will ensure growth of the local economy.

In order to ensure growth in the local economy the following must be implemented;

- *Preference to local unskilled labour*
- *Facilitate mechanisms to enable these local people to access more long term employment opportunities.*
- *Where practically possible reserve a set number of jobs for young women.*
- *Facilitate mechanisms to enable women to access these employment opportunities.*
- *Ensure that equity in remuneration for men and women doing the same job.*

SECTION F : DEVELOPMENT PHASE

Before site clearing commences Northern Cape Department of Agriculture, Land Reform and Rural Development must **provide DENC with seven (7) calendar days'** notice of intent to commence with the development phase. The notice must contain proof of **compliance with any specifications of the Environmental Authorization (EA).**

14. Environmental awareness training

In order to achieve environmental management goals and objectives it is important that contractors and other services providers are aware of their responsibility toward environmental legislation, the conditions of the EA and the content of this EMP. The PM must ensure that his staff are well informed about their responsibilities and must at all times ensure that they obey these.

The PM and employees must attend an environmental awareness training session presented by the ECO. This must include information on the key environmental features, the project's environmental requirements, possible environmental impacts, the do's and don'ts, the no go areas, prevention of fires. This must be held within the first week from the commencement date. Thereafter regular training sessions should be arranged to improve awareness levels.

Training records must be regularly updated and monitored to ensure that staff is well informed.

15. The development footprint

In order to minimise the impacts on fauna, flora and ecological process the development footprint should be kept to the proposed 19 hectares.

In order to keep to the smallest possible footprint, the following must be implemented;

- *A site development plan as identified in Section 10 must be adhered to;*
- *Fenced off "no go areas" areas where practical;*
- *No impacts (driving, trampling or any other disturbance) must be allowed in the remainder of the site and in "no go" areas;*

- *Implement activities to mitigate impacts outside the footprint;*
- *Monitor any impacts outside the development footprint;*

16. Mitigation of site clearing impacts

16.1 Faunal and flora Impact Management

The increase of sound levels, clearing of natural vegetation and human presence will have a direct impact on fauna species. The Draft Basic Assessment Report demonstrated that with the actual removal of the vegetation -the impact is permanent loss, however the production practice of strip cultivation (strips > 10m natural veld remains between the planting rows) together with the nature of Rooibos and good management practice and adherence to layout criteria could retain the plant, vertebrate and invertebrate communities and the diversity of the present day.

The result is that these strips can serve as source areas of species for recolonisation of the disturbed area and the restoration of diversity in the medium to long term. There is a good chance therefore that the present terrestrial plant and animal diversity may be restored if the production of Rooibos was to cease for some reason. Ecological functioning at these small scales such as pollination services should be maintained through the retention of the natural strips of vegetation and by virtue of the fact that there are very extensive tracts of natural veld in the surrounding landscape, thus ensuring the propagation of seed from the resident plant communities. The natural vegetation is fire adapted and if left undisturbed for two years after the fire should recover.

In order to mitigate the impact on the faunal and floras pecies, the following must be implemented;

- *Remove animals from the affected site to adjacent safe areas;*
- *No fauna species may be collected and removed from the site;*
- *Enforcement of conditions of the EMPr by PM;*
- *Prevent illegal hunting and*
- *No burning of cleared vegetation is allowed during the summer;*

16.2 Substrate Management

The soil is sensitive to erosion (wind and water) and the following guidelines should be implemented to prevent erosion;

- *Ensure regular road maintenance which would include immediately stabilizing unstable portions of access roads. This can be achieved through an effective system of run-off control from hardened or denuded surfaces or where water flows down slope.*
- *Regular monitoring of the site for signs of sheet and gulley erosion would be the most effective mitigatory measure.*
- *In instance where accelerated levels of erosion are occurring, stabilizing these areas either with natural vegetation,*
- *Establish the natural strips (>10m);*
- *Avoid activities that could impact on the functionality and the condition of these natural strips;*

16.3 Heritage Resource Management

No possible impacts where identified by the specialist - **See Appendix D – Specialist reports in the Basic Assessment Report.**

However the following procedures should be adhered to if any other unmarked human remains, or ostrich eggshell caches, for example, are exposed or uncovered during excavations these must immediately be reported to Heritage Western Cape (Att: Ms Natasha Higgit 021), or the contracted archaeologist (Jonathan Kaplan 082 321 0172).

16.4 Visual impact management

The levels of visual impact are significant but are aligned with the general look of the surrounding landscape. The surroundings are almost exclusively used as Rooibos and small stock production systems.

Required Mitigation Measures:

- *Disturbed areas should be kept to a minimum.*
- *The development footprint should be clearly demarcated and no development outside of the footprint should be allowed.*
- *Only existing tracks and roads should be used in preference wherever possible.*

- *Strip cultivation where the windrows of natural vegetation should be >10m wide must be maintained at all times.*

16.5 Storage and handling of fuels and chemicals

During the establishment of the cultivated lands fuel and oil will used by machinery. In order to prevent contamination of drainage lines, water and soils the following must be implemented;

- *The PM must ensure that fuels (e.g. drums of fuel, grease, oil, brake fluid, hydraulic fluid) are stored and handled in a bunded area to prevent spillage;*
- *In the event of a spill, appropriate steps must be undertaken to prevent widespread pollution;*
- *Regular maintenance of vehicles and equipment is needed to prevent leaks - No equipment or vehicles with leaks is allowed to work on the site;*

16.6 Spills

The contractor shall set up a procedure (method statement) for dealing with spills, which will include notifying the ECO and the relevant authorities immediately following the spillage event. These procedures must be developed in consultation with the ECO. The clean- up of spills caused as a result of the development activities, and any damage to the environment, shall be for the PM own account. A record must be kept of all spills and the corrective action taken.

16.7 Waste management

Waste that will be generated during the development phase would be the cut vegetation and general household waste (tins, paper and plastic) and hazardous waste (fuel and oils). The following guidelines should be implemented to prevent any environmental impacts and contamination of drainage lines and groundwater;

- *Identify and designate temporary waste management areas – away from no-go areas;*
- *Implement waste reduction, re-use and recycling principles and activities;*
- *Remove all household waste on a daily basis*
- *No refuse or any other waste will be dumped, buried or burned on the property;*

16.8 Increased noise and dust levels

Noise and dust will be generated during the establishment of the cultivated lands – however the impacts of noise and dust in this remote agricultural community would be generic across most properties within the landscape.

17. Monitoring and evaluation

A photographic record of the site and its immediate surrounds must be kept as part of the EMPr to serve as a baseline of all future visual impacts and as an aid to the full rehabilitation of the site should the development be decommissioned in the future. During the site clearing phase it will be important to monitor and evaluate all activities to ensure that these activities are aligned with the EA and this EMPr. Monitoring must also identify other impacts that may cause significant environmental impacts for which corrective actions should be developed and implemented. The frequency of monitoring will be determined by the E.A., but is it recommended that is done in a quarterly basis.

The ECO will be responsible for the monitoring and evaluation of activities and will include the following;

- *Compliance to the environmental specifications;*
- *Develop and implement appropriate interventions to address noncompliance;*
- *Develop and implement interventions to address environmental degradation;*
- *Ensure adequate record keeping relating to environmental compliance is in place;*
- *Ensure communication channels to authorities and stakeholders are open and transparent.*
- *Ensure that the PM adhere to the method statements*.

******** See Appendix 4 – Environmental audit report and Appendix 5 – Fines and penalties.

Based on these the ECO will report to the Project manager and will use Non-compliance-, Monitoring- and the Final Audit reports. The Non-compliance Report describes the non-compliance issues by the contractor, will contain fines and penalties and will prescribe actions and activities that should be implemented to rectify the non-compliance activity. The Monitoring Report will be compiled on a monthly basis and submitted to DEA&DP as part of the Completion Report. The Final Audit report must be submitted to DENC when the construction and rehabilitation phases are completed. This report should contain a date, details of the auditor and outcome of the audit in terms of compliance with the EA and this EMPr.

SECTION G: OPERATIONAL PHASE

Once the Rooibos Tea cultivated lands are productive and operations will focus on, minimised soil erosion, management and protection of the natural strips and adherence to best practice guidelines.

18. Minimise soil erosion

During the operational phase accelerated soil erosion can result from;

- *Strong winds;*
- *An event e.g. thunderstorms and*
- *When existing drainage systems become ineffective due to bad maintenance programmes.*

The following activities should be implemented to avoid impact soil;

- *Ensure that the natural strips remains intact and are not disturbed;*
- *Ensure that no negative impacts occur on the remaining natural areas e.g. driving off roads, overgrazing, too frequent fires;*
- *Regular monitoring of the site for signs of wind, sheet and gulley erosion and implement mitigatory measure immediately;*
- *Maintain drainage and erosion control systems (run-offs, drainage channels, contours) on a monthly basis during the rainy season.*

19. Management of natural vegetation strips

The remaining strips that contain indigenous vegetation are important to minimise erosion and to ensure that natural processes and patterns are maintained and protected – however the following guidelines should be implemented to ensure that the condition of these strip are maintained;

- *Prevent overgrazing and trampling when fallow lands are grazed by domestic stock;*
- *Prevent too frequent fires or burning these strips to enlarge production areas;*
- *Prevent wildfires by education and fire awareness strategies;*

- *Adhere to good practice guidelines when using biocides;*
- *Trampling by people and or vehicle's and machinery must be prevented;*

20. Best Practice guidelines

The owner of Tweeriviere, is a member of the 74 member Heiveld Co-operative and is therefore a n certified organic producer. The Co-operative was founded in 2003 and became the first rooibos producer in the world to be certified by Fairtrade Labelling Organisations International (FLO) and by Naturland - this is still applicable and therefore the production practice will adhere to international requirements. As a member of the Co-op, the owner will ensure that best practice guidelines are implemented on the property.

SECTION H : DECOMMISIONING

When considering the purpose, need and objective for the establishment of the cultivated Rooibos Tea lands it is not envisage that the operation will be decommissioned. However if decommissioning is needed it should comply to Environmental legislation applicable at that time and should keep the following in mind;

- *Demarcation of the decommissioning site,*
- *Erosion control,*
- *Regular road maintenance of the roads that will remain after decommissioning,*
- *Regular monitoring of the site for signs of sheet, wind and gulley erosion would be the most effective mitigatory measure,*

SECTION I : CONCLUSION

In our assessment of impacts the cost benefit of the development favours proceeding as the majority of negative impacts are low. Importantly, many of the negative impacts can be mitigated successfully trough the implementation and adherence to this EMP'r which will further diminish the significance of impact. The clear cost benefit for the proposed development is related to the socio-economic benefits that have the potential to empower individuals through building a financial sustainable business, employment opportunity and supporting emerging farmer.

SECTION J : REFERENCES

Helme NA. 2016. Botanical assessment of proposed new cultivation of Rooibos Tea on Tweeriviere, Farm, Suid Bokkeveld, Northern Cape. Nick Helme Botanical Surveys

Kaplan, J 2016, Heritage Impact Assessment, proposed cultivation of Rooibos Tea on Farm 958, Tweeriviere, Nieuwoudtville, Hantam Municipality, Northern Cape.

Pretorius, M. 2015. A complete soil investigation survey to ascertain the suitability for the cultivation of virgin soil for the production of Rooibos Tea at Sonderwaterkraal and Tweeriviere in the Nieuwoudtville Area, BVi Consulting Engineers, Upington.

SECTION K : APPROVAL

_____	_____	_____
Name	Signature	Dated

Northern Cape Department of Agriculture, Land Reform and Rural Development

APPENDIX 1: CURRICULUM VITAE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONERS

The following information on the directors of FOOTPRINT Environmental Services clearly indicates that extensive experience and expertise exists within the consultancy to compile Environmental Management Programmes.

Sean Ranger holds an MSc in Sustainable Environmental Management the thesis dealing with a Bayesian GIS model for species distributions in the Western Cape. On leaving University he gained eight years experience in Research & Development for Bayer (Pty) Ltd and five years of contractual experience in Stewardship and the varied fields of conservation development & strategic planning, implementation and management and has successfully co-founded and co-managed FOOTPRINT Environmental Services that is now nearing its third year.

He has been very active in the Stewardship Arena for a number of years and was a team member on the first Stewardship Pilot Project that was initiated in 2001/2002 in the Western Cape. He managed the Agter Groenberg Pilot Site one of two pilot sites identified through use of the CAPE Lowlands Fine-scale Conservation Plan. The pilot phase of stewardship was regarded as a highly successful project and produced some of the first Contract Nature Reserves in South Africa. One of them, the Elandsberg Nature Reserve an in perpetuity contract which saw the conservation of significant sections of Critically Endangered Swartland Shale Renosterveld. The experience gained during this period included the use fine scale conservation plans (at that time the CAPE Lowlands Project) to identify priority sites for stewardship interventions, designing pamphlets and presentations on stewardship for the intervention, succeeding in on the ground negotiation with landowners in an agricultural setting for the establishment of stewardship sites, including testing and refining contractual agreements with landowners, assisting with the development of the stewardship database, developing Environmental Management Plans and contributing to the Stewardship Operational Manual for the CapeNature Stewardship program.

From here he joined the Greater Cederberg Biodiversity Corridor (CAPE Landscape Scale Conservation Intervention) as a project manager, an in this capacity used the initial experience gained from the Stewardship Pilot Project to develop a stewardship implementation methodology in a landscape scale conservation intervention context and undertook the development of framework for the engagement of the agricultural

sector to mainstream biodiversity conservation. Here the stewardship focus was on the establishment of biodiversity corridors in two key areas, the Sandveld Core Corridor and the Cederberg Core Corridor. The character of these two sites differed dramatically in that the Sandveld Core Corridor is an area that was rapidly transformed for Potato & Rooibos production, while the Cederberg Core Corridor was based within the boundaries of a well established conservancy, the Cederberg Conservancy. Additional experience gained here included developing a strategic approach to stewardship within a broadly focussed landscape initiative, this included the integration of an Area-wide planning process with stewardship, developing and initiating the core corridor concept, developing a corridor database, the development of a 12-step negotiation process for stewardship, refinement of Environmental Management Plans, co-authoring the first drafts of an operational approach to corridor formation, chairing multi-stakeholder task teams (Sandveld Task Team) and later as a Senior Project Manager and as the Acting Co-ordinator of the GCBC exposure to writing of project proposals, sourcing international funding, strategic planning and management and personnel management, budgeting, preparing workplans and action plans etc.

As the owner of Ranger Consulting CC he has contributed to the development of a biodiversity best practices guideline for both the potato and Rooibos tea industries this built on initial experience obtained on the Steering Committee of the Biodiversity and Wine initiative. It included the development of the terms of reference for the consultants and later the development of an implementation strategy for the potato best practices project and the development of an Environmental Management Plan, Project plans and an auditing system. He has been responsible for the piloting and implementation of these guidelines since March 2008 on 35 producer farms. He has authored a Legal Compliance Strategy for the industry that is currently being implemented through an Intergovernmental Task Team.

Charl du Plessis holds a National Diploma and National Higher Diploma in Nature Conservation and has 17 years experience in conservation management on statutory conservation areas as well as on private and communal properties. He was the manager of the Cederberg Wilderness, a World Heritage Site for 12 years. During this time he gained an in depth knowledge of long and short term strategic biodiversity conservation planning, and implementation issues. He compiled various integrated action plans that focus on the implementation of conservation issues with timeframes and budgets. This was not done only for CapeNature but also for private landowners within conservancies. He was also responsible for the management of staff, contractors, management of ecological systems and processes (aliens, fire, footpaths, erosion, water

systems and wetlands, rehabilitation and infrastructure development and maintenance as well as research and monitoring) within this Wilderness and surrounding conservancies and communities.

During the 2004 – 2008 he was involved in the Greater Cederberg Biodiversity Corridor acting as a negotiator and establishing a network of privately and communal owned contract nature reserves but was also part of the team that completed the 20 year stewardship strategy for CapeNature in the Greater Cederberg Biodiversity Corridor. The establishment and management of the contract nature reserve also entailed the completion of vision and mission statements, management objectives and action plans, budget allocations and finding co-funding to improve management of these areas. He also establishes the Greater Cederberg Fire Protection Association (GCFPA) and various community based tourism initiates and biodiversity related projects such as the Northern Cederberg Donkey Cart Route and the Algeria Buchu nursery. The Algeria Buchu nursery was established with co-funding that he secured. All these projects were based on Community Based Natural Resource Management (CBNRM) principles. During this period he was also responsible for the supervision of a international funded RARE education and awareness campaign in the Cederberg region that focus on conservation education and awareness.

Since 2008 – 2010 he is the manager of the GCFPA that focused on integrated fire management in the region – this comprises of fire preparedness, reduction in fires, the implementation of risk mitigation action plans and strategies.

Over the last couple of years, FES have produce various reports such as the Bergrivier Municipality LAB Biodiversity Report (2010), Biodiversity Assessments, Risk Mitigation Plans for Agricultural producers including aspects like accreditation, erosion control, rehabilitation and monitoring, Fire Management Plans, Integrated Fire and Invasive Alien Plant species Clearing Plans, Area-wide Planning for the Nieuwoudtville Plateau, Erosion and Footpath Management Plan for the Groot - Winterhoek World heritage Site and a Environmental management Plan for Rooibos Limited and various licence arrangements for landowners - ***Please visit www.footprintservices.co.za***

ENVIRONMENTAL MANAGEMENT PROGRAMME AUDIT CHECKLIST

Project name: Rooibos development at Tweeriviere, Farm 958/0 Nieuwoudtville	Date: _____/_____/20___
Name of the Auditor:	Landowner Representative:

	AUDIT QUESTION	YES	NO	ACTION	COMMENTS
METHOD STATEMENTS					
1	Are all method statements developed and signed of				
2	Are all actions described in the method statement implemented				
SOCIAL RESPONSIBILITY					
3	Are local contractors and workers employed				
4	Are women employed				
5	Are training and capacity building programmes in place				
6	Are women and men doing the same job equally remunerated.				
ENVIRONMENTAL AWARENESS					
7	Are environmental awareness programmes developed and implemented				

8	Did all the contractors and employers attend awareness training sessions				
FAUNA AND FLORA MANAGEMENT					
9	Is there any visible evidence of disturbance to fauna and flora				
DEMARCATION AND SITE CLEARANCE					
10	Is the footprint and grave site demarcated				
11	Are the no go and drainage areas fenced off				
12	Have construction activities remained within the designated working areas?				
13	Were all construction materials stored in the appropriate designated area?				
14	Have all decommissioned materials been removed from site?				
15	Have all surplus materials from the excavation site been removed				
16	Are the footprint within the proposed 19.9 ha				
SUBSTRATE MANAGEMENT					
17	Is erosion visible				
18	Has the demarcated access route/s been used?				
19	Are these roads effectively managed				
20	Is erosion visible				

21	Are erosion control mechanisms in place				
22	Are erosion control mechanisms working effectively				
HERITAGE MANAGEMENT					
23	Have any archaeological and heritage resources been exposed during the excavation process				
24	Has the contractor followed the prescribed steps to inform the component authority about the exposure.				
VISUAL IMPACT MANAGEMENT					
25	Has disturbance been kept to the minimum				
26	Is there any evidence of new road / pathways being established?				
27	Are complaints from the community adequately resolved?				
STORAGE AND HANDELING OF FUELS AND CHEMICALS					
28	Are steps and mechanisms in place to handled spills?				
29	Are there any visible signs of spillage of oil and /or diesoline				
WASTE MANAGEMENT					
30	Have temporary waste storage areas been identified				
31	Any visible evidence of waste lying around.				
NOISE AND DUST MANAGEMENT					

32	Is a system in place that the community can lodge their complaints				
33	Are these complaints adequately resolved?				
34	Is an effective road maintenance programmes in place				

APPENDIX 3: SCHEDULE OF FINES FOR ENVIRONMENTAL DAMAGE OR EMP TRANSGRESSIONS

EMP TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	MIN. FINE	MAX. FINE
Failure to comply with prescriptions regarding appointment of an ECO and monitoring of EMP compliance.	R500	R1000
Failure to comply with prescriptions regarding environmental awareness training.	R500	R5000
Failure to comply with prescriptions regarding method statements.	R500	R5000
Failure to report environmental damage or EMP transgressions to the ECO.	R500	R1000
Failure to carry out instructions of the ECO regarding the environment or the EMP.	R500	R1000
Failure to comply with prescriptions posting of emergency numbers.	R500	R5000
Failure to comply with prescriptions regarding a complaints register.	R500	R1000
Failure to comply with prescriptions regarding information boards.	R500	R1000
Failure to comply with prescriptions regarding site demarcation and enforcement of 'no go'	R500	R5000
Failure to comply with prescriptions regarding site clearing.	R500	R5000
Failure to comply with prescriptions for supervision for loading and off loading of delivery vehicles.	R500	R1000
Failure to comply with prescriptions for securing of loads to ensure safe passage of delivery vehicles.	R500	R1000
Failure to comply with prescriptions for the storage of imported materials within a designated	R500	R1000
Failure to comply with prescribed administration, storage or handling of hazardous substances.	R500	R1000
Failure to comply with prescriptions regarding equipment maintenance and storage.	R500	R1000
Failure to comply with fuel storage, refueling, or cleanup prescriptions.	R500	R1000
Failure to comply with prescriptions regarding procedures for emergencies (spillages and fires).	R1000	R5000
Failure to comply with prescriptions regarding construction camp.	R500	R5000
Failure to comply with prescriptions for the use of ablution facilities.	R500	R1000
Failure to comply with prescriptions regarding water provision.	R500	R1000
Failure to comply with prescriptions for the use of designated eating areas, heating source for cooking or presence of fire extinguishers	R500	R1000
Failure to comply with prescriptions regarding fire control.	R500	R5000
Failure to comply with prescriptions for solid waste management.	R500	R5000
Failure to comply with prescriptions regarding road surfacing.	R500	R5000
Failure to comply with prescriptions to prevent water pollution and sedimentation	R500	R5000
Failure to comply with prescriptions to the protection of natural features, flora, fauna and archaeology and palaeontology	R500	R5000
Failure to comply with prescriptions regarding speed limits.	R500	R1000
Failure to comply with prescriptions regarding noise levels of construction activities.	R500	R5000
Failure to comply with prescriptions regarding working hours.	R500	R5000
Failure to comply with prescriptions regarding aesthetics.	R500	R1000
Failure to comply with prescriptions regarding dust control.	R500	R1000
Failure to comply with prescriptions regarding security and access onto private property	R500	R1000
Failure to comply with prescriptions regarding cement and concrete batching	R500	R5000

APPENDIX H – EAP Details

Sean Ranger holds an Masters Degree in Sustainable Ecological Management with a thesis dealing with a Bayesian GIS model for species distributions in the Western Cape. On leaving University he gained eight years experience in Research & Development for Bayer (Pty) Ltd and five years of contractual experience in Stewardship and the varied fields of conservation development & strategic planning, implementation and management and has successfully co-founded and co-managed FOOTPRINT Environmental Services that is now nearing its seventh year of operation as an environmental consultancy.

He was very active in the Stewardship Arena for a number of years and was a team member on the first Stewardship Pilot Project that was initiated in 2001/2002 in the Western Cape. He managed the Agter Groenberg Pilot Site one of two pilot sites identified through use of the CAPE Lowlands Fine-scale Conservation Plan. The pilot phase of stewardship was regarded as a highly successful project and produced some of the first Contract Nature Reserves in South Africa. One of them, the Elandsberg Nature Reserve an in perpetuity contract which saw the conservation of significant sections of Critically Endangered Swartland Shale Renosterveld. The experience gained during this period included the use fine scale conservation plans (at that time the CAPE Lowlands Project) to identify priority sites for stewardship interventions, designing pamphlets and presentations on stewardship for the intervention, succeeding in on the ground negotiation with landowners in an agricultural setting for the establishment of stewardship sites, including testing and refining contractual agreements with landowners, assisting with the development of the stewardship database, developing Environmental Management Plans and contributing to the Stewardship Operational Manual for the CapeNature Stewardship program. Much of this planning required the use of spatial datasets and experience was gained in the practical application of a GIS, ArcView

From here he joined the Greater Cederberg Biodiversity Corridor (CAPE Landscape Scale Conservation Intervention) as a project manager, an in this capacity used the initial experience gained from the Stewardship Pilot Project to develop a stewardship implementation methodology in a landscape scale conservation intervention context and undertook the development of framework for the engagement of the agricultural sector to mainstream biodiversity conservation. Here the stewardship focus was on the establishment of biodiversity corridors in two key areas, the Sandveld Core Corridor and the Cederberg Core Corridor. The character of these two sites differed dramatically in that the Sandveld Core Corridor is an area that was rapidly transformed for Potato & Rooibos production, while the Cederberg Core Corridor was based within the boundaries of a well established conservancy, the Cederberg Conservancy. Additional experience gained here included developing a strategic approach to stewardship within a broadly focussed landscape

initiative, this included the integration of an Area-wide planning process with stewardship, developing and initiating the core corridor concept, developing a corridor database, the development of a 12-step negotiation process for stewardship, refinement of Environmental Management Plans, co-authoring the first drafts of an operational approach to corridor formation, chairing multi-stakeholder task teams (Sandveld Task Team) and later as a Senior Project Manager and as the Acting Co-ordinator of the GCBC exposure to writing of project proposals, sourcing international funding, strategic planning and management and personnel management, budgeting, preparing workplans and action plans etc. All forward planning for this project required the development of a spatial plan (GIS) and as the project manager he developed these plans using various spatial datasets available to CapeNature, the Dept of Agriculture etc. using the in house CapeNature GIS software Arcview 3.2.

As the owner of Ranger Consulting he has contributed to the development of a biodiversity best practices guideline for both the potato and Rooibos tea industries this built on initial experience obtained on the Steering Committee of the Biodiversity and Wine initiative. It included the development of the terms of reference for the consultants and later the development of an implementation strategy for the potato best practices project and the development of an Environmental Management Plan, Project plans and an auditing system. He has been responsible for the piloting and implementation of these guidelines since March 2008 on 35 producer farms. GIS was used extensively to produce detailed farm landuse and infrastructure maps, monitor the rate of transformation of natural and threatened ecosystems year to year. Additionally the development of GIS databases for Fire Protection Agencies. In early 2012 he developed the GIS database and mapping products for the Greater Cederberg FPA and in collaboration with the management of the GCFPA has maintained this database and associated mapping products for the last three years. The GIS software program used here was ArcGIS 10. Recently this GCFPA GIS database has been seamlessly uploaded to the AFIS system.

As a co-owner and Director with Charl du Plessis of FOOTPRINT Environmental Services he has successfully concluded numerous Environmental Applications and obtained Record of Decisions (RoD) for clients. These include a number of environmental assessments for bulk infrastructure for the Department of Public Works, bulk services supply for the City of Cape Town, Eco-tourism developments, agricultural expansion developments both irrigated and dryland, weir developments on rivers in the Cederberg Wilderness, Basic Assessment for the Kromrivier Weir (PGR Developments Pty Ltd.) and a Basic Assessment for the Rondegat Weir (CapeNature) for private individuals and CapeNature. We recently successfully concluded a residential application in Ceres that required the diversion of the river channel to its historical course after it was canalised. Additionally the consultancy has significant experience in the

compilation of Environmental Management Programmes both for the management of development sites and for conservation and agricultural management sectors. We have experience in Rectification applications under Section 24 (g) and compliance monitoring experience as Environmental Control Officers. A short synopsis of environmental assessments successfully concluded has been forwarded to you.

The consultancy has in-depth knowledge and experience in the Public Participation Process (PPP) as described by DEA&DP Public Participation Guidelines during the application process. However we were additionally responsible for, and facilitated, the approval of five (5) CapeNature Protected Area Management Plans trough a PPP - ***Please visit www.footprintservices.co.za*** for more information or contact either of the directors – see contact information above.

Finally Sean Ranger is a certified EAP with EAPSA and is an active Member of the IAIAsa. We are awaiting certification as a Professional Ecologist from SACNASP.

APPENDIX I – Other