DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

FOR

APPLICATION FOR RECTIFICATION FOR THE UNLAWFUL COMMENCEMENT OF ACTIVITIES IN TERMS OF SECTION 24G OF NEMA (107 OF 1998), ON SANDFONTEIN (FARM 232 PORTION 2), BONNIEVALE, WESTERN CAPE

DEA&DP Ref No.: E12/2/4/4-B1/3-1001/11

MAY 2011
# TABLE OF CONTENTS

1. BACKGROUND........................................................................................................................................4

2. APPLICABLE LEGISLATION..........................................................................................................................4

   2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (108 of 1996).................................5

   2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA) (107 of 1998) AND THE NEMA
       EIA REGULATIONS (GN. 543, 544, 545 AND 546 OF 2010).............................................................5

   2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (10 of 2004)....................7

   2.4 NATIONAL WATER ACT (36 of 1998) .................................................................................................7

   2.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (43 of 1983).....................................7

   2.6 LAND USE PLANNING ORDINANCE (15 of 1985) .............................................................................8

   2.7 THE WESTERN CAPE PROVINCIAL DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND
       DEVELOPMENT PLANNING (DEA&DP) GUIDELINES .....................................................................8

   2.8 THE DRAFT WESTERN CAPE RURAL LAND-USE PLANNING AND MANAGEMENT
       GUIDELINES ......................................................................................................................................9

   2.9 CAPENATURE’S REQUIREMENT WITH RESPECT TO BIODIVERSITY IN DEVELOPMENT
       APPLICATIONS ....................................................................................................................................10

3. DESCRIPTIVE OVERVIEW...........................................................................................................................11

3.1 LOCATION AND SITE DESCRIPTION .................................................................................................11

4. RELEVANT ACTIVITIES.............................................................................................................................11

   4.1 CONSTRUCTION PRIOR TO THE SECTION 24G APPLICATION PROCESS (PRE-
       AUTHORIZATION) .................................................................................................................................11

   4.2 PROPOSED CONSTRUCTION (POST-AUTHORIZATION) ....................................................................12

   4.3 THE OPERATIONAL PHASE .............................................................................................................13

   4.4 THE DECOMMISSIONING PHASE ....................................................................................................13

5. SUMMARY OF IMPACTS..............................................................................................................................14

   5.1 CONSTRUCTION PHASE IMPACTS .................................................................................................14

   5.2 OPERATIONAL PHASE IMPACTS ....................................................................................................15

6. MANAGEMENT GOALS...............................................................................................................................16

   6.1 DEFINING MANAGEMENT GOALS: REHABILITATION OR RESTORATION? .........................16

   6.2 DETERMINING THE ‘PRE-DISTURBANCE, ORIGINAL CONDITION’ OF THE SITE................17

   6.3 DEFINING RESTORATION GOALS FOR TERRESTRIAL AND AQUATIC ECOSYSTEMS....17

   6.4 RECOMMENDED REHABILITATION GOALS ..............................................................................18

      6.4.1 The dam and watercourse ........................................................................................................18
6.4.2 The road and terrace............................................................................................................ 19

6. REHABILITATION AND MANAGEMENT PLAN........................................................................... 20

6.1 CONSTRUCTION PHASE........................................................................................................... 20

6.2 OPERATIONAL PHASE ............................................................................................................. 21

7. MONITORING AND REPORTING ............................................................................................ 23

8. REFERENCES............................................................................................................................. 24
1. BACKGROUND

Rhebokskloof Trust, represented by Mr. M. Brandon-Kirby, hereafter referred to as the ‘Applicant’, as owner of the Farm Sandfontein (Portion 2 of Farm 232), Bonnievale, hereafter referred to as the ‘Property’, purchased the farm with the intention of clearing and developing the site in order to build a house on the Property to live there. The farm was purchased in order to build a home, in close and convenient proximity to an adjacent property of which he is also the owner and intends developing for agricultural purposes. He also planned to make a small dam across an ephemeral watercourse which would aid as a safe stream crossing to facilitate access to the site, as well as provide water for recreational and aesthetic purposes.

The Applicant commenced with earthworks and clearing of vegetation land with the intention of constructing a single private dwelling which is consistent with the consent uses for land with agricultural zoning. Certain activities in terms of the National Environmental Management Act (107 of 1998) were commenced without the necessary authorisation from the Department of Environmental Affairs and Development Planning (DEA&DP). A Compliance Notice was issued to the Applicant by the DEA&DP Directorate: Enforcement and Compliance instructing the Applicant to cease all activity and apply for rectification and authorisation in terms of Section 24G of NEMA.

An Environmental Impact Assessment (EIA) was undertaken by BolandEnviro Consultants to assess the impacts and assist the DEA&DP to make a decision regarding this application for rectification and authorisation.

This Environmental Management Programme (EMP) provides an operational framework and serves as a guideline document with regards to the rehabilitation, construction and operational activities associated with the proposed development of the dwelling and small instream dam on the Property.

The guidelines, operating procedures and control measures contained in this EMP will be binding after its approval. Expansion or adaptation of this management plan may be required in specific circumstances.

2. APPLICABLE LEGISLATION

This Environmental Impact Assessment (EIA) is being undertaken in terms of Section 24G of the National Environmental Management Act (Act 107 of 1998), which relates to the rectification of the unlawful commencement of listed activities.

Other legislation and policy that may, however, also apply to this application includes:
− The National Environmental Management: Biodiversity Act 10 of 2004;
− The National Water Act 38 of 1998;
− The Conservation of Agricultural Resources Act 43 of 1983;
− The Land Use Planning Ordinance 15 of 1985;

Several technical and interpretive guidelines may also apply to aspects of the application, these include:

− DEA&DP. 2010. *Guideline on Need and Desirability, EIA Guideline and Information Document Series*. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP);
− The draft Western Cape Rural Land-use Planning and Management Guidelines (2009);
− The draft Langeberg Spatial Development Framework (2010); and
− CapeNature’s requirements and recommendations with respect to applications for environmental, mining, agriculture, water, and planning-related authorisations (2009).

A brief description of the most relevant environmental legislation is provided below. The implications of each of these regulatory or policy instruments are described in more detail in the Environmental Impact Report.

**2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (108 of 1996)**

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and to have the environment protected for the benefit of present and future generations through reasonable measures. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

**2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA) (107 of 1998) AND THE NEMA EIA REGULATIONS (GN. 543, 544, 545 AND 546 OF 2010)**
The National Environmental Management Act (107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the relevant authorities based on the findings of an environmental assessment.

NEMA is a national act, which is enforced by the national Department of Environmental Affairs, but certain powers have been assigned to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), which in this instance is the recognised competent authority.

NEMA section 24(F)(1) specifies that no-one may undertake a listed or specified activity without environmental authorisation and, in terms of NEMA s 24F(2)(a), it is an offence to do so.

According to the regulations of Section 24(5) of NEMA, authorisation was required for the following activities related to the development on Sandfontein (Farm 232/2), and for which rectification is being sought.

**Listing Notice 1 (Basic Assessment), GN R. 544 of 2010**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>The construction of... (iv) dams... where such construction occurs within a watercourse or within 32 metres of a watercourse...</td>
</tr>
<tr>
<td>18</td>
<td>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from (i) a watercourse...</td>
</tr>
</tbody>
</table>

**Listing Notice 2 (Scoping and EIA), GN R. 545 of 2010**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>The construction of a dam, where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher...</td>
</tr>
</tbody>
</table>

NEMA, through Section 24G, provides a process that can lead to the rectification of unauthorised, unlawful activities. The ‘rectification process’ entails submission of an EIA to the competent authority that, in turn, can have two potential outcomes:

- An instruction to ceased the activity, either wholly or in part, and to rehabilitate the environment;¹ or
- Authorisation, subject to conditions, of the activity/ies that had been commenced unlawfully (i.e. continuation).²

---

¹ s 24G(2)(a), NEMA
² s 24G(2(b), NEMA
2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (10 of 2004)

The National Environmental Management: Biodiversity Act (10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the NEM: Air Quality Act and the NE: Coastal Zone Act.

The NEMBA has the purpose to provide for the:

- Management and conservation of South Africa’s biodiversity within the framework of the National Environmental Management Act, 107 of 1998;
- Protection of species and ecosystems that warrant national protection;
- Sustainable use of indigenous biological resource;
- Fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; Establishment and functions of a South African National Biodiversity Institute; and
- For matters connected therewith.

Section 73 deals with Duty of Care relating to invasive species, while Section 76(2) calls for development of invasive species monitoring, control and eradication plans by all organs of state in all spheres of government, as part of environmental management plans required in terms of Section 11 of NEMA.

2.4 NATIONAL WATER ACT (36 of 1998)

The National Water Act (36 of 1998) (NWA) has the purpose to ensure that South Africa’s water resources are protected, used, developed, conserved, managed and controlled in ways which inter alia (b) promotes equitable access to water, (c) redress for past racial discrimination, (e) facilitates social and economic development, (g) protects aquatic and associated ecosystems and their biological diversity, (h) reduces and prevents pollution and degradation of water resources and (k) manages floods and droughts.

2.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (43 of 1983)

The Conservation of Agricultural Resources (Act 43 of 1983) (CARA) is enforced by the Department of Agriculture, Forestry and Fisheries (DAFF). CARA has the objectives of conserving the natural agricultural resources of South Africa, through the maintenance of the production potential of the land, by combating and preventing erosion and the weakening of water sources, the protection of vegetation and the combating of weeds and invader plants.
It is understood that CARA would only be applicable if the proposed change in land use was for agricultural purposes which, in this case, would not apply.

### 2.6 LAND USE PLANNING ORDINANCE (15 of 1985)

The Land Use Planning Ordinance (15 of 1985) (LUPO) provides a framework for strategic spatial planning as well as land use control.

Farm 232/2 Bonnievale is zoned as Agriculture I. In terms of the 1988 Scheme Regulations (Provincial Notice 1048/1988), Agriculture I provides for a primary dwelling unit. The Applicant does not need consent from the municipality to construct a primary dwelling, but must submit building plans. Council consent must, however, be obtained for the erection of additional dwellings up to a maximum number of five units at a density of one unit per 10 ha.

### 2.7 THE WESTERN CAPE PROVINCIAL DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING (DEA&DP) GUIDELINES

There are a number of guideline documents and conservation plans that must inform the work of both the environmental practitioner and specialists. Of direct relevance are:

- The Department of Environmental Affairs and Development Planning Guidelines on Public Participation (2009);
- DEA&DP guideline on involving biodiversity specialists in EIA (2005);
- DEA&DP guideline on involving visual specialists in EIA (2005); and
- The Draft Western Cape Rural Land-use Planning and Management Guidelines (2009).

Relevant aspects of each of the guidelines are summarised below.

**Public participation**

The public participation guideline provides information on the DEA&DP’s interpretation of the public participation requirements of the EIA regulations (2009), describing appropriate mechanisms for notifying interested and affected parties of their right to comment on applications (e.g. through the use of notice boards on site, or the placement of notices in the local newspaper), specifying minimum periods for public comment.

**Biodiversity**

The DEA&DP guideline on involving biodiversity specialists in EIA processes (2005) places a very strong emphasis on pre-empting irreversible loss of biodiversity and ecological functioning through proactive planning and impact avoidance.
As this is a retrospective “application”, these considerations can no longer apply, since transformation has occurred. Mitigation through remediation – not avoidance – is the only alternative strategy.

Key elements of the DEA&DP biodiversity guidelines that have been implemented, are:

- Adoption of an ecosystem approach to impact assessment;
- Addressing impacts on biodiversity at the major levels of hierarchical organisation (species, communities/habitats, and the landscape);
- Reference to the *Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape* (De Villiers et al, 2005); and
- Relating impact significance to ecological management objectives and the thresholds that underpin Critical Biodiversity Areas.

The environmental assessment also makes explicit the substantive and qualitative differences between environmental rehabilitation and ecological restoration.

**Visual impacts**

The guideline on involving visual specialists in EIA (2005) was used to define the various categories of visual impact in terms of the scale and significance of the activity and the nature and sensitivity of the receiving environment, thus obtaining a categorisation of ‘visual impact’ and the level of study required to assess and mitigate impact.

### 2.8 THE DRAFT WESTERN CAPE RURAL LAND-USE PLANNING AND MANAGEMENT GUIDELINES

The draft Western Cape Rural Land-use Planning and Management Guidelines (DEA&DP 2009a)³ are based on the Western Cape Provincial Spatial Development Framework, an approved section 4(6) structure plan in terms of the Land-use Planning Ordinance 15 of 1985. They aim to:

- Promote sustainable development in appropriate rural locations throughout the Western Cape;
- Safeguard the functionality of the province’s life-supporting ecosystem services;
- Maintain the integrity, authenticity and accessibility of the province’s significant farming, ecological, cultural and scenic rural landscapes and natural resources;
- Assist Western Cape municipalities to plan and manage their rural areas more effectively; and

Provide clarity to the province’s social partners on what kind of development is appropriate beyond the urban edge, suitable locations where it could take place, and the desirable form and scale of such development.

These guidelines delineate Spatial Planning Categories (SPCs) in terms of, among others, the biodiversity categories that are used by CapeNature’s Critical Biodiversity Area maps\(^4\) for Western Cape municipalities. Such SPCs indicate the type of land use that should be accommodated in the SPC and where these land use should take place. CBA maps, in turn, provide desired management objectives for the various mapped biodiversity categories that underpin SPCs.

The CBAs and SPCs are particularly relevant to evaluation of the significance of potential impacts on biodiversity and ecosystems.

2.9 CAPENATURE’S REQUIREMENT WITH RESPECT TO BIODIVERSITY IN DEVELOPMENT APPLICATIONS

The Western Cape Nature Conservation Board Act (15 of 1998) designates CapeNature as the statutory custodian of biodiversity in the Western Cape.

The organisation requires that a biodiversity assessment must be undertaken if a development may result in the loss of habitat or ecological functioning in any of the following situations, or if there is any doubt about the biodiversity value of an area (CapeNature 2008):

- Rivers, wetlands, groundwater-dependent communities and estuaries;
- Critical Biodiversity Areas and Ecological Support Areas;
- Viable or connected Critically Endangered and Endangered ecosystems;
- Any area identified by a systematic conservation plan as important for biodiversity conservation;
- Any special habitat with unique signature of species;
- Any habitat with rare, threatened or range-restricted plant or animal species;
- Natural habitat in ecological corridors or along vegetation boundaries, including frontal dune systems; or
- Mountain Catchment Areas.

CapeNature recommends that CBA maps be used as the primary biodiversity informant in the Western Cape Province. Although the CBA maps represent the best available information, they need to be ground-truthed and do not replace the need for a specialist assessment (Ralston et al., 2009). Ground-truthing is also needed to identify potential errors in land cover mapping.

\(^4\) Cf. http://bgis.sanbi.org
3. DESCRIPTIVE OVERVIEW

3.1 LOCATION AND SITE DESCRIPTION

The Property is located approximately 15 km south-west of Bonnievale and falls under the Langeberg Municipal jurisdiction. The site subject to this application is located at 34° 02' 53.30"S; 20° 00' 27.96"E, on a north-facing slope about 300 m amsl in the Riviersonderend Mountains.

The vegetation on site is recognised as ‘North Sonderend Sandstone Fynbos’ (Ffs 13) by the Vegetation Map of South Africa (Mucina and Rutherford, 2006). It is designated ‘Least Threatened’ by the 2009 draft list of threatened ecosystems. The vegetation has been described more recently and at a larger scale as ‘McGregor Arid Fynbos’ by the C.A.P.E. Fine-Scale Planning Project.

The Critical Biodiversity Area map that forms part of the Biodiversity Sector Plan for the Witzenberg, Breede Valley and Langeberg Municipalities depicts about a quarter of the Sandfontein property as a terrestrial Critical Biodiversity Area. The watercourses on the property are described as ‘Other Ecological Support Areas’. Refer to the Environmental Impact Assessment Report for more detail.

4. RELEVANT ACTIVITIES

Considering that the construction phase had already commenced prior to this application for rectification and authorisation, the relevant construction activities have been split into a pre- and post-authorisation phase. Site preparation has commenced, but no buildings have been constructed.

4.1 CONSTRUCTION PRIOR TO THE SECTION 24G APPLICATION PROCESS (PRE-AUTHORISATION)

The unlawful actions that were undertaken without authorisation, in order to prepare the site are as follows (Figure 1):

- A small instream dam was excavated in an unnamed ephemeral watercourse between the existing gravel road and the site of the proposed dwelling. The dam was bulldozed to provide a crossing over the watercourse. An earthen overflow was also bulldozed. The footprint of the dam measures 0.124 ha (1 240 m²) and it has an estimated volume of about 100 m³. The dam does not require a water use license in terms of capacity,
however, because the height of the dam wall exceeds 5 m, it constitutes a listed activity in terms of NEMA (Act 107 of 1998).

- An access road (track) of about 150 m long was cleared to link the proposed site of the dwelling with the existing gravel road. The newly-cleared track traverses across the top of the dam wall to the cleared site (terrace) for the proposed dwelling. The track is 4.2 m in width, the width of the bulldozer blade. A total area of approximately 0.063 ha (630 m²) of natural fynbos vegetation was cleared for the construction of the track.

- An area of approximately 0.387 ha (3,870 m²) of natural vegetation was cleared for the house. The cleared area comprises the following elements: a flat terrace on which the proposed dwelling will be built, rock and soil spoil downslope face of the terrace and exposed rock upslope face of the terrace face. The rock face upslope is three to four metres high and about 20 m wide, the spoil downslope face is three to four metres high and about 20 m wide.

![Figure 1: Preparation of the site includes an excavated terrace for the proposed dwelling, a small instream dam, and an access track that runs from an existing gravel road to the proposed dwelling, as viewed from the east.](image)

### 4.2 PROPOSED CONSTRUCTION (POST-AUTHORISATION)

- The Applicant intends to live on the farm and intends to construct a house on the excavated terrace. The proposed dwelling would be designed according to ‘green’ architectural principles that would allow it to merge with its surrounds and be operated independently of the electricity grid, and other municipal services such as water, refuse and sewerage.

- The Applicant proposes to complete the construction of the dam as required in accordance with specialist input on dam safety and including the implementation of prescribed rehabilitation measures.

- The Applicant intends to complete the gravel access road (track), along with the implementation of rehabilitation measures as described in the EMP.

- The Applicant will landscape and re-vegetate disturbed areas with locally, indigenous plants.
4.3 THE OPERATIONAL PHASE

- Operational activities will include typical day-to-day activities associated with living in a rural home.

4.4 THE DECOMMISSIONING PHASE

The proposed development will be permanent and it is highly unlikely that a decommissioning phase will be applicable to this development.
5. SUMMARY OF IMPACTS

An Environmental Impact Report identified various impacts associated with the unlawful activities on the Property, including:

- Impacts on indigenous vegetation (i.e. habitat, as a surrogate for biodiversity pattern);
- Impacts on fire regimes and pollination at a scale of <1ha (i.e. ecological process);
- Impacts on seeps, with respect to:
  - Hydrological regimes;
  - Water quality;
  - Erosion and sedimentation;
  - Ecological connectivity and habitat quality;
- Impacts on Critical Biodiversity Areas (CBA);
- Impacts on Other Ecological Support Areas (OESA);
- Impacts on the socio-economic environment, with respect to -
  - Visual Impacts

Most impacts already occurred as a result of the unlawful clearance and excavation of land, while other possible future impacts were also identified. The key environmental impacts that are associated with the development prior to mitigation include:

5.1 CONSTRUCTION PHASE IMPACTS

- Botanical/biodiversity: The loss of vegetation at the site as a result of land clearing, although highly localised, in the absence of any threats to plant species or habitats of special concern. North Sonderend Sandstone Fynbos is non-threatened and well presented in the surrounding landscape.
- Ecological processes: The site could be a point source of unplanned or undesirable fire, as well as introduction of alien plant species. Pollinators such as sunbirds and rodents are unlikely to be affected by the disturbed area in question.
- Seeps - hydrological regime: Possible changes to the seasonal flow regime and availability of water downstream due to artificial impoundment of the system.
- Water quality: Potential changes to the proportion of total dissolved solids, siltiness and turbidity of the affected runoff as a result of erosion.
- Erosion and sedimentation: Reduced infiltration due to denudation of vegetation in the dam excavation and disturbance to the physical structure of the hillslope.
- Ecological connectivity and habitat quality: Connectivity would be affected if organisms are prevented from occupying ecotones between the bed and banks of hillslope seeps. The functioning of seeps would in turn jeopardise habitat quality and associated biodiversity.
Critical Biodiversity Areas (CBA): The site falls within a CBA. The loss of any habitat in a CBA is viewed as highly undesirable and contrary to the primary management objective of CBAs, namely biodiversity conservation.

Visual impact: The cleared terrace is visible from the Boesmansriver minor road and farmsteads, and the McGregor-Ashton road. The visual impact is currently considered to be of ‘moderate’ negative significance.

5.2 OPERATIONAL PHASE IMPACTS

The overall negative impact on ecology and biodiversity will be low, should the recommended mitigation measures be implemented;

The Applicant proposes to implement a programme to keep the immediate surrounding area clear of invasive alien vegetation (positive impact);

A low visual impact is expected during the operational phase if the proposed ‘green’ architectural principles are implemented.

Table 1 provides a summary of the significance of key impacts associated with the development. A significance rating is provided for each impact with and without mitigation. Refer to the EIA Report for a more detailed discussion on the identification, assessment and evaluation methodology that was used.

Table 1: Summary of impact assessment and evaluation of significance of impacts

<table>
<thead>
<tr>
<th>Impact</th>
<th>Alternative 1: Retention of the ‘status quo’ (‘do nothing’)</th>
<th>Alternative 2: Restoration of the disturbed areas</th>
<th>Alternative 3: Limited development with restoration of the remaining disturbed areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous vegetation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of habitat</td>
<td>Med(-) Med(-) n/a</td>
<td>V low(-) Med(-) Low(-)</td>
<td></td>
</tr>
<tr>
<td>Ecological processes</td>
<td>Low(-) Low(-) n/a</td>
<td>V low(-) Low(-) Low(-)</td>
<td></td>
</tr>
<tr>
<td>Hydrology (Seeps)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrology</td>
<td>High(-) Med(-) n/a</td>
<td>V low(-) High(-) Low(-)</td>
<td></td>
</tr>
<tr>
<td>Water quality</td>
<td>Assessed under impacts on sedimentation and erosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion and sedimentation</td>
<td>High(-) High(-) n/a</td>
<td>Med(-) Med(-) Low(-)</td>
<td></td>
</tr>
<tr>
<td>Connectivity &amp; habitat quality</td>
<td>High(-) Low(-) n/a</td>
<td>V low(-) Med(-) Low(-)</td>
<td></td>
</tr>
<tr>
<td>Critical Biodiversity Areas</td>
<td>High(-) High(-) n/a</td>
<td>Low(-) High(-) Med(-)</td>
<td></td>
</tr>
</tbody>
</table>
6. MANAGEMENT GOALS

This section broadly defines the standards that would guide rehabilitation at the site, i.e. rehabilitation in support of reinstating environmental amenities and preventing further degradation, or interventions that aim to restore biodiversity and ecological functioning at the site to a ‘pre-disturbance’ condition where possible.

It also introduces the ecological management objectives for seeps with the view of eliminating restorative interventions that are not consistent with these objectives, as well as identifying the objectives that specifically would apply to this EMP.

Lastly, management actions are identified to remedy environmental damage at the site.

6.1 DEFINING MANAGEMENT GOALS: REHABILITATION OR RESTORATION?

Management interventions are defined and shaped by their intended objectives. Such objectives can include:

- Prevention of environmental degradation by neutralising a cause or driver of undesirable environmental change, without any attempt to remedy adverse effects;
- Mitigation, which would entail reducing the environmental effects of an activity or course of action without stopping it or necessarily preventing further environmental harm from occurring;
- Rehabilitation of some of the original, pre-disturbance conditions and possibly some that were not there originally in order to serve a particular societal purpose (e.g. turning derelict land into a sportsfield, reinstating pasturage in a previously mined area or concealing unsightly erosion); and
- Restoration, or management to return a damaged ecosystem to its pre-disturbance condition by re-establishing pre-disturbance, structural and functional ecological attributes, and related physical, chemical and biological characteristics with the ultimate goal of “(emulating) a healthy, natural, self-regulating system that is integrated into the natural landscape…” (Cairns, 1993, p 193).
6.2 DETERMINING THE ‘PRE-DISTURBANCE, ORIGINAL CONDITION’ OF THE SITE

For planning purposes, the ‘original condition’ is taken to be the condition of the site and surrounds directly before the unauthorised activities occurred.

Insofar as it can be reasonably established, the site was largely natural, except for the gravel track leading to the neighbouring Du Toit property and the previously disturbed grassed area downslope from the terrace.

The watercourse was apparently in a natural condition. There are scattered alien plants in the vicinity that probably pre-date the activities in question.

Rehabilitation goals will need to be cognisant of the largely natural condition of the receiving environment prior to the excavations in question.

6.3 DEFINING RESTORATION GOALS FOR TERRESTRIAL AND AQUATIC ECOSYSTEMS

Given the high contextual biodiversity value of the area, ‘rehabilitation’ is interpreted in terms of the objectives for CBAs insofar as these promote:

− Prevention of ecological degradation; and
− Restoration to a natural or near-natural condition.

Whereas the direct cause of ecological degradation has been terminated (i.e. the mechanical excavation of vegetation and soil), the resultant transformation would potentially contribute to ongoing environmental degradation through:

− Soil erosion and release of sediments into watercourses;
− Creating opportunities for local colonisation by alien plants; and
− Exacerbation of edge effects (particularly desiccation).

With appropriate intervention, these impacts could probably be prevented and at least contained to the site.

The question of the feasibility of restoration, notwithstanding its desirability, cannot be answered with equal confidence, though.

Helme et al. (2005, p 50) note that recovery of transformed midland and mountain fynbos is not guaranteed if soil characteristics have been altered and aliens have
moved in (the latter has not occurred). A large proportion of species should recover after the next fire if topsoil and seed-banks are intact.

In this instance, there has been wholesale removal of topsoil, so recovery of indigenous vegetation to even a near-natural state through passive reliance on natural recruitment and successional processes, supported by managed application of fire, would probably not be successful.

6.4 RECOMMENDED REHABILITATION GOALS

Three alternative courses of action were proposed in the EIA Report:

1. The first one would be to do nothing and leave the site as it is (No-Go Alternative).

2. The second would be to aim for the complete restoration of the disturbed area (Restoration Alternative).

3. The third would be to combine limited development of the site with a rehabilitation program (Rehabilitation and Limited Development Alternative) (Preferred Alternative).

The first option is undesirable, due to the degradation that has occurred to the site. The second option is viewed as unreasonable and unachievable as it is highly unlikely that the physical transformation that has taken place can be reversed to a pre-disturbance state.

It will however be quite feasible to allow limited development of the site while promoting the rehabilitation of disturbed areas. A Rehabilitation and Limited Development Alternative (option 3) was therefore proposed as the preferred alternative course of action.

It is recommended that rehabilitation thus focuses on prevention of further degradation and restoration of basic ecosystem functions in relation to:

- The watercourse; and
- The areas cleared for the access road and terrace.

6.4.1 The dam and watercourse

In the case of the watercourse, restoration of ecosystem functionality would primarily entail stabilising the denuded banks against erosion and re-establishing a vegetated buffer to filter run-off in the channel and protect the adjacent veld against soil loss and edge effects.
6.4.2 The road and building terrace

The proposed treatment for the remainder of the cleared areas is essentially identical: re-vegetate the perimeter of the disturbed site with locally occurring species and remove invasive alien plants. It is preferable to sow seed and reintroduce plants in late summer or autumn as succession is likely to fail if left too late into the season.

Holmes et al. (2008, p 547) recommend that a mix of local pioneer, understorey (herb and shrub) species should be sown. A second site visit will be made during May 2011 by a Botanical Specialist to confirm botanical findings made during an initial site visit in January. Recommendations will be included in the Final EMP.

The prospects of restoring the road and terrace to a pre-disturbance, natural condition are viewed as exceedingly unlikely due to the irremediable loss of topsoil and, crucially, the seed-bank. Securing these areas against particularly soil loss is important. Commercial non-invasive grasses may be contemplated for such disturbed areas (Holmes et al., 2008, 547). Transverse drainage may be necessary on the road track.

The goal of rehabilitation with limited restoration of ecological functions is consistent with the recommendation by environmental assessment that limited development of the site should be permitted in conjunction with a restoration programme (preferred alternative – option 3).
6. REHABILITATION AND MANAGEMENT PLAN

The construction phase will consist of the physical building of the dwelling and the completion of the dam. It will also include the rehabilitation of disturbed areas and the implementation of mitigation measures to facilitate the natural recovery of the ecosystem. All appropriate mitigation measures should be implemented by the Applicant.

6.1 CONSTRUCTION PHASE

<table>
<thead>
<tr>
<th>Objective</th>
<th>Mitigation: Action/control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation of ephemeral watercourse</td>
<td>▶ Stabilise denuded banks of the watercourse.</td>
</tr>
<tr>
<td></td>
<td>▶ Establish a vegetated buffer by re-vegetating denuded areas with appropriate indigenous species.</td>
</tr>
<tr>
<td></td>
<td>▶ Make use of geotextile, hydro-mulching or similar material if and where necessary until re-vegetated areas are established and will combat bank instability and soil erosion.</td>
</tr>
<tr>
<td></td>
<td>▶ Seek expert advice from a horticulturalist with experience in the civil engineering sector, if necessary.</td>
</tr>
<tr>
<td></td>
<td>▶ Minimise trampling of intact vegetation by containing movement to disturbed areas.</td>
</tr>
<tr>
<td>Rehabilitation of access track and terrace</td>
<td>▶ Natural vegetation recovery should be encouraged to re-establish.</td>
</tr>
<tr>
<td></td>
<td>▶ Re-vegetate the verges of disturbed areas.</td>
</tr>
<tr>
<td></td>
<td>▶ Make use of the appropriate fynbos species.</td>
</tr>
<tr>
<td></td>
<td>▶ Seek expert advice from a horticulturalist with experience in the civil engineering sector, if necessary.</td>
</tr>
<tr>
<td></td>
<td>▶ Irrigate re-vegetated areas until plants are established.</td>
</tr>
<tr>
<td></td>
<td>▶ Remove all alien plants on an ongoing basis.</td>
</tr>
<tr>
<td></td>
<td>▶ Ensure adequate drainage.</td>
</tr>
<tr>
<td></td>
<td>▶ Minimise trampling of intact vegetation by containing movement to disturbed areas.</td>
</tr>
<tr>
<td>Reduce risk of soil erosion</td>
<td>▶ Existing footpaths and tracks should be used to access sites.</td>
</tr>
<tr>
<td></td>
<td>▶ The use of heavy vehicles or machinery alongside the dam should be prohibited.</td>
</tr>
<tr>
<td></td>
<td>▶ Any erosion damage should be repaired as soon as possible.</td>
</tr>
<tr>
<td></td>
<td>▶ Stabilise denuded banks of the watercourse and excavated dam.</td>
</tr>
<tr>
<td></td>
<td>▶ Calculate dam water levels (minimum and maximum) and re-vegetate the banks accordingly.</td>
</tr>
<tr>
<td></td>
<td>▶ Stabilise denuded areas with geotextile or similar material until re-planted vegetation has established to a level sufficient to combat erosion and sedimentation.</td>
</tr>
<tr>
<td></td>
<td>▶ Clear any alien vegetation from the banks.</td>
</tr>
<tr>
<td></td>
<td>▶ Replace any dead plants with indigenous species.</td>
</tr>
</tbody>
</table>
### Draft Environmental Management Programme (EMP) for Rhebokskloof Trust

<table>
<thead>
<tr>
<th>Objective</th>
<th>Mitigation: Action/control</th>
</tr>
</thead>
</table>
| Re-establish the natural hydrological flow regime | ✓ Construct the dam according to specialist dam safety recommendations.  
✓ Construct a sufficient dam spillway (overflow).  
✓ The seasonal availability of water need to be factored into the design of the spillway structure and management of the excavated area.  |
| Protection of adjacent vegetation | ✓ Limit construction activities to the already disturbed areas.  
✓ Existing footpaths and tracks should be used to access sites.  
✓ Dust levels should be kept to a minimum to avoid smothering of sensitive areas by windblown sediments.  
✓ Prevent the occurrence of unwanted fires.  |
| Protection of animals | ✓ Trapping and snaring of animals is prohibited.  |
| Solid waste management | ✓ Construction personnel should be instructed not to litter and should only dump waste, including building rubble, at designated areas (e.g. litter drums), which will be transported to the closest licenced landfill site.  
✓ Litter drums should be placed at strategic points for use by personnel and should be emptied regularly and removed to the closest licenced landfill site.  |
| Sewerage and effluent management | ✓ Pollution by fertilizers or contamination by human effluent must be prohibited.  
✓ Toilet facilities (portable toilets) should be available to construction personnel during the construction phase of the development, if necessary.  
✓ Washing and acts of excretion or urination are strictly prohibited other than at the facilities provided.  
✓ The proposed septic tank (for sewage and grey water) must be installed to acceptable specifications and must be located more than 100m from any watercourse or dam.  |
| Reduction of visual impact | ✓ Cleared areas, especially the slope and spoil face below the excavated terrace should be re-vegetated to reduce the visual impact.  
✓ The proposed use of natural building material should be used in construction of the proposed house, which will blend into the natural surroundings.  
✓ Local indigenous species will be used to re-vegetate the site.  
✓ The Applicant does not plan to install exterior flood lights. The proposed dwelling will have normal domestic lighting.  |

### 6.2 OPERATIONAL PHASE

<table>
<thead>
<tr>
<th>Objective</th>
<th>Mitigation: Action/control</th>
</tr>
</thead>
</table>
| Protection of indigenous vegetation | ✓ Existing footpaths and tracks should be used to access sites.  
✓ Dust levels should be kept to a minimum to avoid smothering of sensitive areas by windblown sediments.  
✓ Prevent the occurrence of unwanted fires.  
✓ Maintain the natural fire regime of North Sonderend Sandstone Fynbos (season, intensity and frequency), as determined by CapeNature or a fynbos ecologist. It is one of the main ecological drivers of this ecosystem.  |
| Periodic fires are needed to stimulate recruitment and maintain maximum species richness. The maximum interval between fires should not exceed the active reproductive period of fynbos. | The establishment of alien vegetation should be prevented through monitoring and control. | Prevent the occurrence of unwanted fires. |
| The Applicant is advised to consult the Zonderend Conservancy regarding a possible fire management programme that could be implemented on Rhebokskloof, Sandfontein. | Follow-up removal of alien plants should be conducted at regular intervals. | Maintain the natural fire regime of North Sonderend Sandstone Fynbos (season, intensity and frequency), as determined by CapeNature or a fynbos ecologist. It is one of the main ecological drivers of this ecosystem. |
| Maintain appropriate alien control regimes. | The re-establishment of natural vegetation within the footprint area should be encouraged. | Periodic fires are needed to stimulate recruitment and maintain maximum species richness. The maximum interval between fires should not exceed the active reproductive period of fynbos. |
| Landscaping of the development must be done with local indigenous vegetation. | The Applicant is advised to consult the Zonderend Conservancy regarding a possible fire management programme that could be implemented on Sandfontein. | Maintain appropriate alien control regimes. |

| Prevent establishment of alien and invasive vegetation | Prevent the occurrence of unwanted fires. | Preventing the establishment of alien and invasive vegetation. |
| The establishment of alien vegetation should be prevented through monitoring and control. | Maintain the natural fire regime of North Sonderend Sandstone Fynbos (season, intensity and frequency), as determined by CapeNature or a fynbos ecologist. It is one of the main ecological drivers of this ecosystem. | Permits the occurrence of unwanted fires. |
| Follow-up removal of alien plants should be conducted at regular intervals. | The re-establishment of natural vegetation within the footprint area should be encouraged. | Preventing the occurrence of unwanted fires. |
| Landscaping of the development must be done with local indigenous vegetation. | The Applicant is advised to consult the Zonderend Conservancy regarding a possible fire management programme that could be implemented on Sandfontein. | Preventing the occurrence of unwanted fires. |

| Maintenance of natural fire regime | Prevent the occurrence of unwanted fires. | Protecting the animals from unwanted fires. |
| Prevent the occurrence of unwanted fires. | Maintain the natural fire regime of North Sonderend Sandstone Fynbos (season, intensity and frequency), as determined by CapeNature or a fynbos ecologist. It is one of the main ecological drivers of this ecosystem. | Preventing the occurrence of unwanted fires. |
| Maintain the natural fire regime of North Sonderend Sandstone Fynbos (season, intensity and frequency), as determined by CapeNature or a fynbos ecologist. It is one of the main ecological drivers of this ecosystem. | Permits the occurrence of unwanted fires. | Preventing the occurrence of unwanted fires. |
| Periodic fires are needed to stimulate recruitment and maintain maximum species richness. The maximum interval between fires should not exceed the active reproductive period of fynbos. | The Applicant is advised to consult the Zonderend Conservancy regarding a possible fire management programme that could be implemented on Sandfontein. | Preventing the occurrence of unwanted fires. |

| Protection of animals | Trapping and snaring of animals is prohibited. | Protecting the animals from unwanted fires. |
| Trapping and snaring of animals is prohibited. | | Protecting the animals from unwanted fires. |
| Prevent erosion and sedimentation | Modifications to the bed or bank of the watercourse should be prohibited. | Preventing the occurrence of unwanted fires. |
| Modifications to the bed or bank of the watercourse should be prohibited. | Maintain stormwater management structures. | Preventing the occurrence of unwanted fires. |
| Maintain stormwater management structures. | | Preventing the occurrence of unwanted fires. |
| Ensure sufficient stormwater management | Water discharged from roads and other hard surfaces should be via sufficiently maintained drainage channels, directed into vegetated areas, and preferably not directly into seeps. | Preventing the occurrence of unwanted fires. |
| Water discharged from roads and other hard surfaces should be via sufficiently maintained drainage channels, directed into vegetated areas, and preferably not directly into seeps. | | Preventing the occurrence of unwanted fires. |
| Water resource management | Water efficient systems are proposed to be installed to minimise water use. | Preventing the occurrence of unwanted fires. |
| Water efficient systems are proposed to be installed to minimise water use. | | Preventing the occurrence of unwanted fires. |
| Solid waste management | All reasonable steps will be taken to minimize wastage. | Preventing the occurrence of unwanted fires. |
| All reasonable steps will be taken to minimize wastage. | Domestic waste will be removed and appropriately disposed of in Bonnievale. | Preventing the occurrence of unwanted fires. |
| Sewerage and effluent management | The septic tank should be maintained. | Preventing the occurrence of unwanted fires. |
| The septic tank should be maintained. | | Preventing the occurrence of unwanted fires. |
| Minimisation of energy usage | Renewable energy sources (e.g. solar power for electricity generation) are planned for the proposed dwelling. | Preventing the occurrence of unwanted fires. |
| Renewable energy sources (e.g. solar power for electricity generation) are planned for the proposed dwelling. | The proposed building will be constructed from thermally efficient materials such as stone and covered with a soil / turf roof. | Preventing the occurrence of unwanted fires. |
7. MONITORING AND REPORTING

The purpose of a monitoring programme is to determine whether the proposed rehabilitation programme meets the goals of preventing degradation, reinstating basic ecological functions, and that rehabilitation-related activities do not contribute to further disturbance of the site.

The detection of environmental change, using indicators, against a set of benchmarks forms the hub of a monitoring programme. The results of a monitoring programme inform which steps, if any, need to be implemented to ensure that an activity remains consistent with the management objectives. Monitoring effort should be proportional to the type and significance of impacts that have been predicted for the receiving environment. See Table 2 for benchmarks and indicators.

An Environmental Control Officer should be appointed for the duration of the construction phase to monitor the activities and make recommendations where necessary, especially with regard to the rehabilitation of the site. Environmental checklists will be included in the Final EMP which can be used for this purpose. Monitoring results must be reported to the DEA&DP on at least at pre-commencement, construction and post-construction phases.

<table>
<thead>
<tr>
<th>The affected environment</th>
<th>Targets</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>The watercourse and dam (indicators after Day and Job, 2005)</td>
<td>Erosion curtailed</td>
<td>Slower and less runoff during rainfall events;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No sheet erosion or formation of gullies are evident;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Occurrence of indigenous aquatic plant species in and around the dam and stream;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sighting of faunal species in proximity of the dam and watercourse;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decrease in siltation and other transported material in the water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water availability downstream is sufficient.</td>
</tr>
<tr>
<td></td>
<td>Establishment of indigenous plant cover in previously disturbed areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disturbed area turned back into safe, natural habitat for fauna</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sufficient water quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restoration of the hydrological functioning of the seep</td>
<td></td>
</tr>
</tbody>
</table>
Access track and terrace

- Erosion curtailed
- Establishment of indigenous plant cover in previously disturbed areas
- No major visual disturbance
- Slower and less runoff during rainfall events;
- No sheet erosion or formation of gullies are evident;
- Occurrence of indigenous plant species which are self-sustaining.
- The cleared site is not conspicuous when viewed from other farmsteads and roads, in particular the McGregor-Ashton road.

**Monitoring methods:**

Fixed point photography before, during and after rehabilitation at monthly intervals.
In situ visual inspection and reporting by ECO with the use of checklists.
Project closure report to Department of Environmental Affairs and Development Planning.

### 8. REFERENCES


