
Prepared by
Leigh-Ann de Wet
(M.Sc., Pri. Sci. Nat)

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Leigh-Ann de Wet
Biodiversity Assessments, Baseline surveys and Impact Assessments and Integrated Biodiversity Management Solutions.
leighann.dewet@gmail.com
083 352 1936
APPOINTMENT OF SPECIALIST
Leigh-Ann de Wet was commissioned by EOH Coastal and Environmental Services to undertake a Botanical Impact Assessment for the proposed SANBI Collections Facilities Hub, Gauteng, South Africa. Terms of reference were to produce an Impact Assessment Report based on detailed photographs collected by Mr Gideon Raath from EOH CES of the plant species that occur on site.

EXPERTISE OF THE SPECIALIST
- M.Sc. in Botany from Rhodes University.
- Registered Professional Natural Scientist with the South African Council for Natural Scientific Professionals (Ecological Science).
- Ecological Consultant since 2009.
- Conducted, or have been involved in over 100 Ecological Impact Assessments, Baseline surveys, Biodiversity Action Plans and Offset Plans.
- Published four scientific papers, two popular articles and have three scientific papers in preparation.
- Presented 7 international conference presentations, and at two Botanical Society meetings.
- Lectured methods for specialist assessment for the Rhodes University short course on EIA.

INDEPENDENCE
Leigh-Ann de Wet has no connection with SANBI and is not a subsidiary of any kind of SANBI. The remuneration for services by EOH CES in relation to this report and associated studies is unrelated to approval by decision-making authorities responsible for authorization of any SANBI activity.

SCOPE AND PURPOSE OF REPORT
The scope and purpose of the report is described in the section on Terms and Reference within this report.
Executive Summary

The South African National Biodiversity Institute (SANBI) has proposed the development of a new office block, immediately adjacent to their existing complex, within the Pretoria National Botanical Garden (NBG), situated within the City of Tshwane Metropolitan Municipality. The development is aimed at addressing the needs of SANBI in terms of expanded administrative, research, educational and tourism activities and will be known as the Collections Facility Hub.

The study area itself fall within a Gauteng C-Plan irreplaceable CBA and a Threatened Ecosystem, and is located in close proximity to protected areas. The site comprises Gold Reef Mountain Bushveld according to Mucina and Rutherford and comprises bushveld, with the dominant tree species *Vachellia karroo* with some *Celtis africana* and *Searsia lancea* and an understory of herbs such as *Hypoestes aristata*, *Barleria karroo* and *Passiflora suberosa*. Fourteen (14) species were recorded from the study site. The site visit resulted in the recording of one Confirmed Species of Conservation Concern, the Endemic and Vulnerable (SA RedList) *Podranea ricasoliana*. The site has a Moderate sensitivity.

Impacts are medium negative and can be reduced to low negative with appropriate mitigations measures (Table 8.1).

### Table 1.1: Summary of impacts associated with the SANBI CFH.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Without Mitigation</th>
<th>With mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Loss of vegetation</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>2: Loss of SCC</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>3: Invasion of alien species</td>
<td>Moderate</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Mitigation and Management:**

- Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation.
- Any stockpiles or laydown areas should be restricted to the area of the site office where possible.
- Any populations of SCC should be avoided wherever possible, where they cannot be avoided, every effort should be made to replant these individuals elsewhere in the gardens, or plant an equivalent or greater number of new individuals elsewhere in the gardens.
- A full site walk-through should be conducted in the summer prior to any construction activities to list all SCC and associated permits should be obtained for their removal or transplantation.
- Any existing and new alien species must be removed as soon as possible after emergence.
- An alien vegetation management plan must be developed to maintain the site free of
alien invasions throughout the construction and operational phase of the development.

Recommendations

In order to proceed with this development, the following is recommended:

1. Permits must be obtained for each of the plant Species of Conservation Concern that will be destroyed or translocated and for general indigenous vegetation removal where required, this must be done by a suitably qualified professional; and
2. Any existing alien vegetation management plan should be applied to the site, if there is no existing plan, one should be developed.
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1 Introduction

The South African National Biodiversity Institute (SANBI) has proposed the development of a new office block, immediately adjacent to their existing complex, within the Pretoria National Botanical Garden (NBG), situated within the City of Tshwane Metropolitan Municipality. The development is aimed at addressing the needs of SANBI in terms of expanded administrative, research, educational and tourism activities and will be known as the Collections Facility Hub.

This assessment provides a brief baseline of the proposed building site, as well as providing a summary of the vegetation and flora on site. Impacts are rated, and mitigation measures to reduce these impacts made.

1.1.1 Terms of Reference

1. An Ecological Assessment Report: This report will be developed from site assessments done to date (will not include a further site visit), in order to identify sensitive vegetation and species of conservation concern present on site and determine the sensitivity of the development footprint. Potential impacts will be assessed and mitigation measures to reduce the impacts proposed as part of this study.

2. Species will be identified using the detailed photographs collected by Mr Gideon Raath of the site and plant species occurring within the site.

1.1.2 Assumptions and limitations

- The field work was conducted over one day on the 15th June 2018 by Mr Gideon Raath, an EOH CES staff member who has experience conducting ecological assessments.
- This report was written based on photographs of the site and of plants present on the site collected by Mr Raath;
- All conclusions, recommendations and impact rating are based on photographs of the site.
2 The study area

2.1 Locality

The proposed site for this development is located adjacent to existing buildings within the Pretoria National Botanical Gardens in the suburb of Silverton, Pretoria, in region 6 of the Tshwane Metropolitan Municipality (Figure 2-1). The site is located along Cussonia Avenue, which is currently used to access the existing Environmental Education Centre and other SANBI buildings.

The Pretoria National Botanical Gardens is approximately 76 hectares and divided into two main areas by a ridge of quartzite. The gardens house the Head Offices of SANBI.

Figure 2-1: Locality map of the SANBI CFH within the Pretoria National Botanical Gardens.
3 Methodology

The methodology for this assessment is based on analyses of available desktop information, a site visit and a resultant sensitivity and impact assessment. The methods of each of these study components are outlined below.

3.1 Desktop Assessment

Available desktop information was assessed to contextualize the site, and several databases and mapping tools were checked. These included the following:

- Google earth imagery was used to determine the current vegetation cover of the site;
- The National Vegetation Map developed by Mucina and Rutherford (2011) was consulted to determine the expected vegetation type;
- The Plants of South Africa (POSA) database was consulted for a list of plant species previously recorded from the Pretoria National Botanical Gardens;
- Conservation Planning Tools such as the List of Ecosystems that are Threatened and in Need of Protection, Wetlands datasets (NFEPA) and the Gauteng Conservation Plan (C-Plan) were mapped for the study site;
- A list of possible invasive species was extracted from the POSA list of plants recorded from the Pretoria National Botanical Gardens;
- A list of Possible Species of Conservation Concern was extracted from the POSA list of plants recorded from the Pretoria National Botanical Gardens though checking the list of recorded species against the following lists:
  - National Protected Tree List (Government Gazette Vol. 593, 21 November 2014, No. 38215);
  - Provincial Protected Species List (Traansvaal Nature Conservation Ordinance No. 12 of 1983);
  - National Protected Species List or TOPS (R 1187 of 2007); and
  - The National Red List for Plants (redlist.sanbi.org, as given by POSA).

3.2 Field Assessment

The site was surveyed on foot, and photographs taken of any plant species encountered.

3.3 Sensitivity Assessment

A list of sensitivity criteria was assessed, and the value of each of these criteria assigned a weighted score. The resultant matrix was then used to produce an overall sensitivity. This assessment determines the overall sensitivity of the site and aids in the making of recommendations with regards to proposed development within the site. Sensitivity criteria include the following:

- Species of Conservation Concern (Any red listed or protected species);
- Presence of sensitive habitats (such as wetlands, rocky outcrops);
- Presence of Critical Biodiversity Areas;
- Level of degradation of the site (erosion, grazing);
- Presence of indigenous vegetation;
- Proximity to watercourses;
- Proximity to wetlands;
- Proximity to National Parks;
- Proximity to other protected areas;
- Proximity to National Protected Areas Expansion Strategy (NPAES) Focus Areas;
- Proximity to Important Bird Areas (IBAs);
- Proximity to Ramsar sites;
- Proximity to World Heritage Sites; and
- Proximity to Threatened Ecosystems as gazetted.

3.4 Impact Assessment

The CES rating scale was used to rate the impacts for this assessment. The methodology is as follows.

Five factors need to be considered when assessing the significance of impacts, namely:

1. Relationship of the impact to **temporal** scales - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
2. Relationship of the impact to **spatial** scales - the spatial scale defines the physical extent of the impact.
3. The severity of the impact - the **severity/beneficial** scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.

The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word ‘mitigation’ means not just ‘compensation’ but includes concepts of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.

4. The likelihood of the impact occurring - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.
5. Each criterion is ranked to determine the overall significance of an activity (Table 3-1). The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood are then read off the matrix presented in Table 3-2 and Table 3-3, to determine the overall significance of the impact. The overall significance is either negative or positive.
<table>
<thead>
<tr>
<th>Temporal Scale</th>
<th>Effect</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short term</td>
<td>Less than 5 years</td>
<td>Unlikely</td>
</tr>
<tr>
<td>Medium term</td>
<td>Between 5-20 years</td>
<td>May Occur</td>
</tr>
<tr>
<td>Long term</td>
<td>Between 20 and 40 years (a generation) and from a human perspective also permanent</td>
<td>Probable</td>
</tr>
<tr>
<td>Permanent</td>
<td>Over 40 years and resulting in a permanent and lasting change that will always be there</td>
<td>Definite</td>
</tr>
</tbody>
</table>

**Spatial Scale**
- Localised: At localised scale and a few hectares in extent
- Study Area: The proposed site and its immediate environs
- Regional: District and Provincial level
- National: Country
- International: Internationally

**Severity**
- Slight: Slight impacts on the affected system(s) or party(ies)
- Moderate: Moderate impacts on the affected system(s) or party(ies)
- Severe/Beneficial: Severe impacts on the affected system(s) or party(ies)
- Very Severe/Beneficial: Very severe change to the affected system(s) or party(ies)

**Benefit**
- Slightly beneficial to the affected system(s) and party(ies)
- Moderately beneficial to the affected system(s) and party(ies)
- A substantial benefit to the affected system(s) and party(ies)
- A very substantial benefit to the affected system(s) and party(ies)

*In certain cases it may not be possible to determine the severity of an impact thus it may be determined: Don’t know/Can’t know*
Table 3-2: Matrix used to determine the overall significance of the impact based on the likelihood and effect of the impact.

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 3-3: Description of Environmental Significance Ratings and associated range of scores.

<table>
<thead>
<tr>
<th>Significance Rate</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>An acceptable impact for which mitigation is desirable but not essential.</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td>The impact by itself is insufficient even in combination with other low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>impacts to prevent the development being approved.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These impacts will result in either positive or negative medium to short</td>
<td></td>
</tr>
<tr>
<td></td>
<td>term effects on the social and/or natural environment.</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>An important impact which requires mitigation. The impact is insufficient</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>by itself to prevent the implementation of the project but which in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>conjunction with other impacts may prevent its implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>These impacts will usually result in either a positive or negative medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>to long-term effect on the social and/or natural environment.</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>A serious impact, if not mitigated, may prevent the implementation of the</td>
<td>HIGH</td>
</tr>
<tr>
<td></td>
<td>project (if it is a negative impact). These impacts would be considered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>by society as constituting a major and usually a long-term change to the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(natural &amp;/or social) environment and result in severe effects or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>beneficial effects.</td>
<td></td>
</tr>
<tr>
<td>Very High</td>
<td>A very serious impact which, if negative, may be sufficient by itself to</td>
<td>VERY</td>
</tr>
<tr>
<td></td>
<td>prevent implementation of the project. The impact may result in permanent</td>
<td>HIGH</td>
</tr>
<tr>
<td></td>
<td>change. Very often these impacts are not able to be mitigated and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>usually result in very severe effects, or very beneficial effects.</td>
<td></td>
</tr>
</tbody>
</table>

The environmental significance scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.
Prioritising
The evaluation of the impacts, as described above, is used to assess the significance of identified impacts and determine which impacts require mitigation measures.

Negative impacts that are ranked as being of “VERY HIGH” and “HIGH” significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e. numerous HIGH negative impacts may bring about a negative decision. For impacts identified as having a negative impact of “MODERATE” significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed. For impacts ranked as “LOW” significance, no investigations or alternatives will be considered. Possible management measures will be investigated to ensure that the impacts remain of low significance.
4 Conservation planning

There are several conservation planning tools that help with guiding proposed developments as well as assessing their ecological sensitivity, each of these was considered and assessed.

4.1 Gauteng C-Plan

The most up to date and comparatively accurate conservation-planning tool is the Gauteng C-Plan. The main purposes of the C-Plan are:

- "to serve as the primary support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process;"
- "to inform protected area expansion and biodiversity stewardship programmes in the province;"
- "to serve as a basis for development of Bioregional Plans in municipalities within the province."

CBAs are areas that need to be conserved in a natural or near natural state order to meet conservation targets, with ESA important for maintaining connectivity. There is an extensive network of these areas in the City of Johannesburg.

The study area falls within an irreplaceable CBA identified by the C-Pan (Figure 4-1 and Figure 4-2) and will result in the loss of less than 0.1ha of vegetation. Compatible land uses for such a CBA include conservation and associated activities and land management recommendations are to obtain formal protection of these sites where possible and implement appropriate zoning to avoid net loss of intact habitat or identified land use.

4.2 Threatened Ecosystems

The list of threatened ecosystems covers terrestrial system only, with aquatic systems covered by NFEPA (See Section 3.4) (SANBI 2018). The ecosystems on the list comprise four categories, which are detailed in Table 4-1. The list of threatened ecosystems aims to reduce the rate of species and ecosystem extinction, reduce degradation of these systems as well as maintain the structure, function and composition of these systems. Threatened ecosystems represent 9.5% of the total area of South Africa (SANBI 2018).
Table 4.1: Categories of Threatened Ecosystems

<table>
<thead>
<tr>
<th>Category</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critically Endangered</td>
<td>CR</td>
<td>Ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation.</td>
</tr>
<tr>
<td>Endangered</td>
<td>EN</td>
<td>Ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems.</td>
</tr>
<tr>
<td>Vulnerable</td>
<td>VU</td>
<td>Ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems.</td>
</tr>
<tr>
<td>Protected</td>
<td>-</td>
<td>Ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.</td>
</tr>
</tbody>
</table>

The study area falls into the Vulnerable Marikana Thornveld, and is surrounded by the Critically Endangered Bronberg Mountain Bushveld (2.8km from the site), Witwatersberg Pretoria Mountain Bushveld (5.2km from the site) and the Magaliesberg Pretoria Mountain Bushveld (4.3km from the site) (Figure 4-3).

The proposed development would result in the loss of less than 0.1ha of the Marikana Thornveld.

4.3 Protected Areas

Formal protected areas are those that are included in the National Environmental Management: Protected Areas Act (Act 57 of 2003) and include nature reserves, national parks and protected environments. Protected areas provide protection against climate change and aid in ecological sustainability (Government of South Africa, 2008). Proximity to protected areas is important, as sites close to these areas may be ecologically sensitive, and buffers around protected areas should be maintained to preserve biodiversity and connectivity.

Several protected areas including the Magaliesberg Protected Natural Environment (4.6km from the site), the Struben Dam Bird Sanctuary (3.7km from the site), Faerie Glen Municipal Nature Reserve (4.1km from the site), Groenkloof National Park (8.4km from the site) and the Groenkloof Nature Reserve (9.5km from the site)2 (Figure 4-4) occur in the region.

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1 National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002).
2 According to the NPAES Formal Protected Areas .shp
Figure 4-1: Critical Biodiversity Areas within and near to the Pretoria National Botanical Garden.
Figure 4-2: Critical Biodiversity Area Designations within and near to the Pretoria National Botanical Garden.
Figure 4-3: Threatened Ecosystems near to the Pretoria National Botanical Garden.
Figure 4-4: Protected Areas within close proximity to the Pretoria National Botanical Garden.
5 Biodiversity baseline

5.1 Vegetation

According to Mucina and Rutherford (2006), there is one vegetation type (Marikana Thornveld) within the Pretoria National Botanical Garden (Figure 5-2).

5.1.1 Marikana Thornveld (SVcb 6)

This vegetation type occurs in Gauteng and the North West province (Mucina & Rutherford 2011). It comprises open Acacia karroo woodland in valleys and on undulating plains and lowland hills. The vegetation type is endangered with a conservation target of 19% and less than 1% statutorily conserved. 48% of the vegetation type is transformed due to cultivation and urban development. (Mucina & Rutherford 2011).

5.1.2 Vegetation of the study area

Vegetation of the study site comprises bushveld, with the dominant tree species Vachellia karroo with some Celtis africana and Searsia lancea and an understory of herbs such as Hypoestes aristata, Barleria karroo and Passiflora suberosa (Figure 5-1). Adjacent to the bushveld is grassland at the sides of roads and access points.
Figure 5-1: Vegetation of the SANBI CFH study site.
Figure 5-2: National Vegetation Map (Mucina & Rutherford, 2012) for the Pretoria National Botanical Garden and surrounds.
5.2 Flora

Overall, the POSA species list includes 430 species (Appendix 2) that occur in the Pretoria National Botanical Garden. All of these species are not present in the relatively small area of the study site (less than 0.1ha) for the proposed CFH. The most common families in the study area include:

- Asteraceae (Daisy family) with 55 species;
- Fabaceae (Pea family) with 42 species;
- Poaceae (Grass family) with 36 species;
- Malvaceae (Mallow family) with 17 species;
- Apocynaceae (Dogbane family) with 15 species; and
- Acanthaceae (Acanthus family) with 13 species.

The study area comprises a relatively small area (less than 0.1ha of the total 76ha of the botanical gardens) and, as such, contains fewer species than the full gardens. Fourteen (14) species were recorded from the study site (Table 5-1). Of these, four (4) have been previously recorded from the site and are present on the POSA list (Figure 5-3). These include *Ziziphus mucronata*, *Barleria obtusa*, *Hypoestes aristata* and *Pondranea ricasoliana*. The remaining 10 species have not yet been recorded from the gardens or could not be identified to species level and thus are assumed not to have been previously recorded.

<table>
<thead>
<tr>
<th>Species</th>
<th>Present on POSA list</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ziziphus mucronata</em></td>
<td>Yes</td>
</tr>
<tr>
<td><em>Solanum</em> sp.</td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Asparagus</em> cf. <em>aethiopicus</em></td>
<td>No</td>
</tr>
<tr>
<td><em>Searsia lancea</em></td>
<td>No</td>
</tr>
<tr>
<td><em>Cymbopogon</em> sp.</td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Vachellia karroo</em></td>
<td>No</td>
</tr>
<tr>
<td><em>Barleria obtusa</em></td>
<td>Yes</td>
</tr>
<tr>
<td><em>Gomphocarpus physocarpus</em></td>
<td>No</td>
</tr>
<tr>
<td><em>Passiflora suberosa</em></td>
<td>No</td>
</tr>
<tr>
<td><em>Hypoestes aristata</em></td>
<td>Yes</td>
</tr>
<tr>
<td><em>Pondranea ricasoliana</em></td>
<td>Yes</td>
</tr>
<tr>
<td><em>Helichrysum</em> sp.</td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Berkheya</em> sp.</td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Celtis africana</em></td>
<td>No</td>
</tr>
</tbody>
</table>
Figure 5-3: Species recorded from the SANBI CFH site. Top: *Barleria obtusa* and bottom: *Ziziphus mucronata.*
5.2.1 Species of Conservation Concern

The expected species list includes 54 possible Species of Conservation Concern (SCC) (Table 5-2). These species include those species that are listed as Endemic (by POSA), or on one or more of the following lists:

- National Protected Tree List (Government Gazette Vol. 593, 21 November 2014, No. 38215);
- Provincial Protected Species List (Traansvaal Nature Conservation Ordinance No. 12 of 1983);
- National Protected Species List or TOPS (R 1187 of 2007); and
- The National Red List for Plants (redlist.sanbi.org, as given by POSA).

The site visit resulted in the recording of one confirmed Species of Conservation Concern, the Endemic and Vulnerable (SA RedList) *Podranea ricasoliana* (Figure 5-4). It is possible that additional SCC may occur on site and that these would be better seen in summer during the flowering season for most such species (usually geophytes or other summer flowering groups). It is recommended that a full walk-through of the site be conducted prior to construction to ensure that all SCC have been recorded, and to apply for the required permits for their removal.

![Figure 5-4: The Vulnerable and endemic Podranea ricasoliana.](image-url)
Table 5-2: Possible Species of Special Concern that may occur within the Pretoria National Botanical Garden, therefore the CHF site.

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Ecology</th>
<th>IUCN</th>
<th>Gauteng</th>
<th>TOPS</th>
<th>Protected Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acanthaceae</td>
<td><em>Crabbea angustifolia</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Dyschoriste costata</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Dyschoriste rogersii</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Petalidium oblongifolium</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliaceae</td>
<td><em>Tulbaghia acutiloba</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amaryllidaceae</td>
<td><em>Crinum bulbispermum</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anacardiaceae</td>
<td><em>Heeria argentea</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Loxostylis alata</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Searsia bataphylla</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apocynaceae</td>
<td><em>Asclepias brevipes</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Brachystelma chloranthum</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Riccreuxia polyantha</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Riccreuxia torulosa</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Araliaceae</td>
<td><em>Cussonia paniculata</em></td>
<td>Indigenous</td>
<td>Sch11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphodelaceae</td>
<td><em>Aloe greatheadii</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
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</tr>
<tr>
<td></td>
<td><em>Aloe zebrina</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asteraceae</td>
<td><em>Brachylaena neriifolia</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
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<tr>
<td></td>
<td><em>Nolletia rarifolia</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
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<tr>
<td></td>
<td><em>Pseudopegolettia tenella</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Bignoniacae</td>
<td><em>Podranea ricasoliana</em></td>
<td>Endemic</td>
<td>VU</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Combretaceae</td>
<td><em>Combretum tenuipes</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
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<td>Convolvulaceae</td>
<td><em>Ipomea bathycalpos</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Crassulaceae</td>
<td><em>Crassula sarmentosa</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Kalanchoe longiflora</em></td>
<td>Endemic</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ericaceae</td>
<td><em>Erica nematophylla</em></td>
<td>Endemic</td>
<td>VU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Erica versicolor</em></td>
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<td>LC</td>
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<td></td>
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<tr>
<td>Euphorbiaceae</td>
<td><em>Jatropha lagarithroides</em></td>
<td>Endemic</td>
<td>LC</td>
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<tr>
<td>Fabaceae</td>
<td><em>Leobordea hirsuta</em></td>
<td>Endemic</td>
<td>LC</td>
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<tr>
<td>Family</td>
<td>Species</td>
<td>Ecology</td>
<td>IUCN</td>
<td>Gauteng</td>
<td>TOPS</td>
<td>Protected Trees</td>
</tr>
<tr>
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<tr>
<td></td>
<td><em>Millettia grandis</em></td>
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<td>x</td>
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<tr>
<td></td>
<td><em>Philenoptera violacea</em></td>
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<tr>
<td></td>
<td><em>Pterocarpus angolensis</em></td>
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<td>LC</td>
<td>Sch11</td>
<td>x</td>
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<td></td>
<td><em>Vachellia erioloba</em></td>
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<td>LC</td>
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</tr>
<tr>
<td>Iridaceae</td>
<td><em>Gladiolus eliotii</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Gladiolus permeabilis</em></td>
<td>Indigenous</td>
<td>LC</td>
<td>Sch11</td>
<td></td>
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</tr>
<tr>
<td>Malvaceae</td>
<td><em>Dombeya autumnalis</em></td>
<td>Endemic</td>
<td>LC</td>
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<tr>
<td></td>
<td><em>Triumfetta sonderi</em></td>
<td>Endemic</td>
<td>LC</td>
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<tr>
<td>Orchidaceae</td>
<td><em>Eulophia hians</em></td>
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<td>LC</td>
<td>Sch11</td>
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<td></td>
<td><em>Eulophia ovalis</em></td>
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<td>LC</td>
<td>Sch11</td>
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<tr>
<td></td>
<td><em>Habenaria epipactidea</em></td>
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<td>LC</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Orthochilus leontaglossus</em></td>
<td>Indigenous</td>
<td>Sch11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poaceae</td>
<td><em>Tristachya biseriata</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proteaceae</td>
<td><em>Leucadendron chamelaea</em></td>
<td>Endemic</td>
<td>CR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucadendron cinereum</em></td>
<td>Endemic</td>
<td>VU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucadendron corymbosum</em></td>
<td>Endemic</td>
<td>VU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucadendron discolor</em></td>
<td>Endemic</td>
<td>VU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucadendron loranthifolium</em></td>
<td>Endemic</td>
<td>NT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucadendron tinctum</em></td>
<td>Endemic</td>
<td>NT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucospermum cordifolium</em></td>
<td>Endemic</td>
<td>NT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucospermum reflexum</em></td>
<td>Endemic</td>
<td>NE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucospermum saxosum</em></td>
<td>Indigenous</td>
<td>EN</td>
<td>Sch11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Leucospermum tottum</em></td>
<td>Endemic</td>
<td>NT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santalaceae</td>
<td><em>Thesium magalismontanum</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Thesium transvaalense</em></td>
<td>Endemic</td>
<td>LC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapindaceae</td>
<td><em>Erythrophysa transvaalenensis</em></td>
<td>Indigenous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.2.2 Alien invasive species

Not all species recorded from the study area and surrounds are indigenous, some of these are not indigenous but have become naturalised. Other species are invasive in nature and legislated by CARA or NEM:BA (Table 5-3 and Table 5-4).

Table 5-3: Conservation of Agricultural Resources Act (CARA) legislation

<table>
<thead>
<tr>
<th>Category</th>
<th>Restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Invader plants must be removed and destroyed immediately. No trade in these plants.</td>
</tr>
<tr>
<td>2</td>
<td>Invader plants may be grown under controlled conditions in permitted zones. No trade on these plants.</td>
</tr>
<tr>
<td>3</td>
<td>Invader plants may no longer be propagated or sold. Existing plants do not need to be removed.</td>
</tr>
</tbody>
</table>

Table 5-4: National Environmental Management: Biodiversity Act (NEM:BA) invasive species legislation.

<table>
<thead>
<tr>
<th>Restriction</th>
<th>Category 1b</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Having in possession or exercising physical control over any specimen of a listed invasive species.</td>
<td>Exempted</td>
<td>Permit required</td>
<td>Exempted</td>
</tr>
<tr>
<td>f. Spreading or allowing the spread of any specimen of a listed invasive species.</td>
<td>Prohibited</td>
<td>Permit required</td>
<td>Prohibited</td>
</tr>
</tbody>
</table>

Twenty-four (24) alien invasive species are expected to be found in and around the Pretoria National Botanical Gardens. Of these, 13 are listed under CARA, and all under NEM:BA (Table 5-5). Of the species recorded from the SANBI CFH, one (1), the Solanum sp. is likely to be invasive.

Table 5-5: Alien invasive species that could occur in and around the Pretoria National Botanical Garden.

<table>
<thead>
<tr>
<th>Species</th>
<th>Common name</th>
<th>CARA</th>
<th>NEM:BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araujia sericifera</td>
<td>Moth catcher</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td>Catharanthus roseus</td>
<td>Madagascar periwinkle</td>
<td>1b</td>
<td></td>
</tr>
<tr>
<td>Campuloclinium macrocephalum</td>
<td>Pom pom weed</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td>Flaveria bidentis</td>
<td>Smelter’s bush</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td>Opuntia aurantiaca</td>
<td>Jointed cactus</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td>Opuntia microdasys</td>
<td>Yellow bunny-ears</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td>Opuntia pubescens</td>
<td>Velvet bur cactus</td>
<td>1a</td>
<td></td>
</tr>
<tr>
<td>Celtis australis</td>
<td>Nettle tree</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Cuscuta campestris</td>
<td>Common dodder</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td>Ipomoea purpurea</td>
<td>Morning glory</td>
<td>3</td>
<td>1b</td>
</tr>
<tr>
<td>Ricinus communis</td>
<td>Castor-oil plant</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Species</td>
<td>Common name</td>
<td>CARA</td>
<td>NEM:BA</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------------------</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td><em>Senna septemtrionalis</em></td>
<td>Arsenic bush</td>
<td>1b</td>
<td></td>
</tr>
<tr>
<td><em>Salvia tiliifolia</em></td>
<td>Lindenleaf sage</td>
<td>1b</td>
<td></td>
</tr>
<tr>
<td><em>Melia azedarach</em></td>
<td>Syringa</td>
<td>3</td>
<td>1b</td>
</tr>
<tr>
<td><em>Passiflora caerulea</em></td>
<td>Blue passion flower</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td><em>Cestrum parqui</em></td>
<td>Chilean caestrum</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td><em>Solanum mauritianum</em></td>
<td>Bug weed</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td><em>Solanum pseudocapsicum</em></td>
<td>Jerusalem cherry</td>
<td>1b</td>
<td></td>
</tr>
<tr>
<td><em>Solanum seaforthianum</em></td>
<td>Potato creeper</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td><em>Solanum sisymbriifolium</em></td>
<td>Dense-throned bitter apple</td>
<td>2</td>
<td>1b</td>
</tr>
<tr>
<td><em>Lantana camara</em></td>
<td>Tick berry</td>
<td>1</td>
<td>1b</td>
</tr>
<tr>
<td><em>Verbena bonariensis</em></td>
<td>Wild verbena</td>
<td>1b</td>
<td></td>
</tr>
<tr>
<td><em>Verbena brasiliensis</em></td>
<td>Brazilian verbena</td>
<td>1b</td>
<td></td>
</tr>
<tr>
<td><em>Verbena rigida</em></td>
<td>Veined verbena</td>
<td>1b</td>
<td></td>
</tr>
</tbody>
</table>
6 Sensitivity Assessment

Sensitivity was based on a set of criteria, scored based on various measures and then calculated within a matrix, an overall sensitivity is then assigned based on the total score. The SANBI CFH site comprises mostly indigenous vegetation, with little to no invasion, or degradation and one (recorded) SCC. It occurs also within 5km of protected areas. It is also located within an Irreplaceable CBA. Such aspects contribute to the overall sensitivity of the site. As such, the overall sensitivity of the site is Moderate.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating</th>
<th>Score</th>
<th>Weighted score</th>
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</thead>
<tbody>
<tr>
<td>Species of Conservation Concern</td>
<td>0 to 5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sensitive Habitats</td>
<td>0-20</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Critical Biodiversity Areas</td>
<td>CBA</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Level of Degradation</td>
<td>13</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Indigenous Vegetation</td>
<td>&gt;80%</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Proximity to watercourses</td>
<td>&gt;100m</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Proximity to wetlands</td>
<td>&gt;100m</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Proximity to National Parks</td>
<td>2.5-5kms</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Proximity to other Protected Areas</td>
<td>2.5-5kms</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Proximity to NPAES Focus Areas</td>
<td>&gt;10kms</td>
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<td>0.7</td>
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<tr>
<td>Proximity to Important Bird Areas</td>
<td>2.5-5kms</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Proximity to Ramsar sites</td>
<td>&gt;10kms</td>
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<td>0.4</td>
</tr>
<tr>
<td>Proximity to World Heritage Sites</td>
<td>&gt;10kms</td>
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<td>0.4</td>
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<tr>
<td>Proximity to Threatened Ecosystems</td>
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<td>3.5</td>
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<td><strong>TOTAL SCORE</strong></td>
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<td>as a /49 percentage</td>
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<tr>
<td>Sensitivity rating</td>
<td></td>
<td><strong>Moderate</strong></td>
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</table>
7 Impact Assessment

The impacts for the proposed development have been rated according to the methodology in Section 3.4. There are three (3) impacts overall, and mitigation measures are recommended for each of the impacts.

**Impact 1: Loss of Vegetation**

**Cause and comment:** The building of the CFH will result in the direct loss of less than 0.1ha of indigenous vegetation. This vegetation is not highly sensitive in and of itself and forms only a small part of the whole Pretoria National Botanical Gardens.

**Significance statement:** The impact will be permanent, restricted to a localised area and definite, with a moderate severity resulting in a moderate negative overall significance. Mitigation measures can reduce this impact to a low negative overall significance.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Effect</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal Scale</td>
<td>Spatial Scale</td>
<td>Severity of Impact</td>
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</tr>
<tr>
<td>Impact 4: Fragmentation of vegetation and edge effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without Mitigation</td>
<td>Permanent</td>
<td>Localised</td>
<td>Moderate</td>
</tr>
<tr>
<td>With Mitigation</td>
<td>Permanent</td>
<td>Localised</td>
<td>Slight</td>
</tr>
</tbody>
</table>

**Mitigation and Management:**
- Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation.
- Any stockpiles or laydown areas should be restricted to the area of the site office where possible.

**Impact 2: Loss of Species of Conservation Concern**

**Cause and comment:** The building of the CFH will result in the direct loss of some individuals of the SCC . *Podranea ricasoliana*, and potentially other species that may not have been recorded at the time of the site visit.

**Significance statement:** The impact will be permanent, restricted to a localised area and definite, with a moderate severity resulting in a moderate negative overall significance. Mitigation measures can reduce this impact to a low negative overall significance.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Effect</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
</tr>
</thead>
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<tr>
<td>Temporal</td>
<td>Spatial Scale</td>
<td>Severity of Impact</td>
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<tr>
<td>Impact 4: Fragmentation of vegetation and edge effects</td>
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<td></td>
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<tr>
<td>Without Mitigation</td>
<td>Permanent</td>
<td>Localised</td>
<td>Moderate</td>
</tr>
<tr>
<td>With Mitigation</td>
<td>Permanent</td>
<td>Localised</td>
<td>Slight</td>
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</table>
Impact 4: Fragmentation of vegetation and edge effects

<table>
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<th>With Mitigation</th>
</tr>
</thead>
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<tr>
<td>Permanent</td>
<td>Localised</td>
<td>Moderate</td>
<td>Slight</td>
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<tr>
<td>Regional</td>
<td>Slight</td>
<td>May occur</td>
<td>Unlikely</td>
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<tr>
<td>Moderate</td>
<td>Definite</td>
<td>MODERATE-</td>
<td>LOW-</td>
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</table>

Mitigation and Management:
- Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation.
- Any populations of SCC should be avoided wherever possible, where they cannot be avoided, every effort should be made to replant these individuals elsewhere in the gardens, or plant an equivalent or greater number of new individuals elsewhere in the gardens;
- A full site walk-through should be conducted in the summer prior to any construction activities to list all SCC and associated permits should be obtained for their removal or transplantation.

Impact 3: Invasion of alien species

Cause and comment: The building of the CFH will result in the influx of seeds and disturbance of existing seedbanks of alien invasive species. Considering the number of alien species already recorded from the Botanical Gardens, this impact will occur and must be managed.

Significance statement: The impact will be permanent, restricted to a regional area and definite, with a moderate severity resulting in a moderate negative overall significance. Mitigation measures can reduce this impact to a low negative overall significance.
Mitigation and Management:
- Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation.
- Any existing and new alien species must be removed as soon as possible after emergence.
- An alien vegetation management plan must be applied to the site to maintain the site free of alien invasions throughout the construction and operational phase of the development.
8 Conclusions and Recommendations

The site, previously disturbed comprises bushveld vegetation in gardens within 50m from existing buildings. The site is situated within an irreplaceable CBA but the sensitivity of the existing vegetation is not particularly high, and the area has been previously disturbed. It is possible that additional SCC may be recorded from the site, as the site visit was conducted in winter when many geophytes and other possible SCC are not flowering. It is recommended that an additional site visit (in the form of a walk through prior to construction) be undertaken in summer to identify any SCC that may have been missed.

Impacts are medium negative and can be reduced to low negative with appropriate mitigations measures (Table 8.1).

Table 8.1: Summary of impacts associated with the SANBI CFH.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Without Mitigation</th>
<th>With mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Loss of vegetation</td>
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<td>Low -</td>
</tr>
<tr>
<td>2: Loss of SCC</td>
<td>Moderate -</td>
<td>Low -</td>
</tr>
<tr>
<td>3: Invasion of alien species</td>
<td>Moderate -</td>
<td>Low -</td>
</tr>
</tbody>
</table>

Mitigation and Management:
- Keep the footprint of the construction as small as possible, the area of construction should be demarcated, and personnel not allowed to heavily use the surrounding natural vegetation.
- Any stockpiles or laydown areas should be restricted to the area of the site office where possible.
- Any populations of SCC should be avoided wherever possible, where they cannot be avoided, every effort should be made to replant these individuals elsewhere in the gardens, or plant an equivalent or greater number of new individuals elsewhere in the gardens;
- A full site walk-through should be conducted in the summer prior to any construction activities to list all SCC and associated permits should be obtained for their removal or transplantation.
- Any existing and new alien species must be removed as soon as possible after emergence.
- An alien vegetation management plan must be applied to maintain the site free of alien invasions throughout the construction and operational phase of the development.
Recommendations

In order to proceed with this development, the following is recommended:

3. Permits must be obtained for each of the SCC plant species that will be destroyed where required, this must be done by a suitably qualified professional; and
4. Any existing alien vegetation management plan should be applied to the site, if there is no existing plan, one should be developed.
9 References


10 APPENDIX 1: Specialist CV

23 John Nettleton Place
Kloof
Durban
Leigh-Ann de Wet
MSc | Pri. Sci. Nat.
Biodiversity Specialist
leighann.dewet@gmail.com
083 352 1936

Profile
A biodiversity specialist with a history in botanical research, biodiversity assessments and associated planning in developing countries. Possesses experience in classification of ecosystems and development of management and monitoring plans for a variety of ecosystems from the spiny thicket of Madagascar to the Rainforests of West and Central Africa. Experience also includes Biodiversity Assessments (comprising classification and mapping of ecosystems and habitats) of ecosystems and vegetation types throughout Southern Africa including grasslands, forests, thicket, bushveld and fynbos with associated conservation and management recommendations.

Key Expertise
- Ecological research methodology development
- Ecological research
- Habitat and vegetation mapping
- Habitat and vegetation classification
- Report and paper writing
- Synthesis of specialist work into integrated assessments
- Ecological statistics
- Environmental Management and Monitoring

Education
- 2005 - 2007 MSc in Botany – Rhodes University
- 2005 BSc Honours in Botany (with Distinction) – Rhodes University
- 2001 - 2004 BSc (Botany and Entomology) – Rhodes University

Courses
- 2013 Wetland Management: Introduction to Law – University of the Free State
- 2013 Wetland Management: Introduction and Delineation Short Course – University of the Free State
- 2011 Land Degradation Short Course – Rhodes University
- 2009 EIA Short Course – Rhodes University and Coastal and Environmental Services

Membership
- 2012 – Present Professional Natural Scientist with SACNASP: Ecological Science (No. 400233/12)
- 2012 – Present High Conservation Value Assessor (plants) with the Round Table of Sustainable Biofuels.
- 2013 – Present South African Association of Botanists
2013 – Present  Botanical Society of South Africa
2013 – Present  Wildlife and Environment Society of South Africa
2013  Grasslands Society of Southern Africa

Professional experience

2014 - Current  Owner of LD Biodiversity Consulting – Biodiversity Specialist
Started own company (Sole Proprietor) to focus on Ecological Assessments including baseline assessments (habitat and ecosystem classification) as well as Management and Monitoring for large projects. Responsibilities include:

- Ecological Surveys including Baseline Assessments, Biodiversity Management and Monitoring Plans and Spatial Planning for biodiversity goals to meet international standards
- Offset design
- Strategic Environmental Planning
- Mapping (QGIS)
- Research
- Financial Management

2012 - 2014  Digby Wells Environmental – Unity Manager: Biophysical
Management of the Biophysical Department, specifically Flora and Fauna although included the overseeing and review of both Freshwater Ecology and Wetlands as well. Responsibilities included:

- Conducting and management of Ecological Baseline and Impact Assessments to meet international standards
- Biodiversity Management and Monitoring Plans
- Management of a team of between four and seven colleagues and specialists

2009 – 2012  Coastal and Environmental Services – Senior Environmental Consultant and Ecological Specialist
Ecological specialist responsible for conducting ecological assessments including baseline and impact assessments for Fauna and Flora. Later in this time for overseeing junior ecologists and training. Key responsibilities included:

- Conducting Ecological Baseline and Impact Assessments to international standards
- Strategic environmental planning
- Managing teams of specialists
- Mapping (Arc)
- Research

2007 - 2009  Rhodes University (South Africa) and Sheffield University (England) – NERC Research Assistant
Design and conducting of a large common or garden experiment looking at the effects of global climate change on grassland composition. Key responsibilities included:

- Experimental design
• Experiment implementation
• Data analyses

Awards

2005 Best Young Botanist second prize for a presentation entitled: “Population biology and effects of harvesting on *Pelargonium reniforme* (Geraniaceae) in Grahamstown and surrounding areas” at the SAAB conference. Dean’s list, Academic Colours, Masters Scholarship.

2004 Putterill Prize for conservation in the Eastern Cape, Dean’s list, Academic Half Colours, Honours Scholarship.

2001 - 2003 Dean’s List

Publications


**de Wet L** (2005). Is *Pelargonium reniforme* in danger? The effects of harvesting on
**Presentations**

<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Title</th>
<th>Event and Location</th>
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<tbody>
<tr>
<td>2013</td>
<td>LR de Wet</td>
<td>Biodiversity Actions Plans for existing mines: Making them Work for Grassland Conservation</td>
<td>Grassland Society of Southern Africa Congress, Limpopo</td>
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<td>2011</td>
<td>LR de Wet</td>
<td>Finding Ecological Benefits of Windfarms</td>
<td>Thicket Forum, Grahamstown</td>
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<td>2010</td>
<td>Lubke, RA, N Davenport, LR de Wet and C Fordham</td>
<td>The ecology and distribution of endorheic pans in the subtropical thicket vegetation near Port Elizabeth, Eastern Cape, South Africa</td>
<td>53rd Annual Symposium, Ensenada, Mexico.</td>
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<td>2006</td>
<td>LR de Wet, Barker, N and Peter, C</td>
<td>Pollinator-mediated selection in <em>Pelargonium reniforme</em> as described by Inter Simple Sequence Repeat markers.</td>
<td>South African Association of Botanists (SAAB) conference.</td>
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<td>2006</td>
<td>LR de Wet, Barker, N and Peter, C</td>
<td>Pollinator-mediated selection of <em>Pelargonium reniforme</em> and two floral morphs described by inter simple sequence repeat markers</td>
<td>Southern African Society for Systematic Biology (SASSB) conference.</td>
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<td>2005</td>
<td>LR de Wet and Vetter, S</td>
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<td>International Association for Vegetation Science, 53rd Annual Symposium, Ensenada, Mexico.</td>
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<td>2005</td>
<td>LR de Wet and Vetter, S</td>
<td>Harvesting of <em>Pelargonium reniforme</em> in Grahamstown; what are the implications for populations of the plant?</td>
<td>Thicket Forum</td>
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## APPENDIX 2 – Expected Plant Species

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<th>Species</th>
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<th>Ecology</th>
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