APPENDIX 6

PLANT SPECIES IMPACT ASSESSMENT FOR PROPOSED CAPE WINELANDS AIRPORT, FISANTEKRAAL, WESTERN CAPE.

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PLANT SPECIES IMPACT ASSESSMENT FOR PROPOSED CAPE WINELANDS AIRPORT, FISANTEKRAAL, WESTERN CAPE.

Compiled for: PHS Consulting, Hermanus

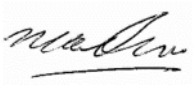
Client: Cape Winelands Airport Ltd.

10 Feb 2025

DECLARATION OF INDEPENDENCE

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

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



NA Helme

ABRIDGED CV:

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

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-western Cape. Since the end of 2001 I have been the Sole Proprietor of Nick Helme Botanical Surveys, and have undertaken over 2000 site assessments in this period.

Peninsula and Cape Flats botanical surveys include: Scoping and Constraints studies for CWA airport (PHS Consulting 2022-2024); Macassar WWTW IA (Zutari 2023); Strandfontein Coastal Node IA (Infinity Environmental 2024); Hazendal Ptns 31& 33 (Monique Sham 2024); N7 weighbridge IA (SES 2023); Suikerbekkie PV project, Joostenberg (CoCT 2022); Erf 254 Atlantis (The Environmental Practice 2021); Erf 255 Atlantis (The Environmental Practice 2021); Portion 17 of Farm 724 Joostenberg Vlakte (County Fair & Enviro-EAP 2021); CoCT Desalination Project for Witzands and Paarden Eiland (CSIR 2020); Vergenoegd development IA (Khula 2019); Haazendal IA (Kapp Environmental 2019); Hout Bay erf 666 IA (Cameron Consulting 2019); Imhoff Farm, Kommetjie IA (Khula

Environmental 2019); Langverwacht, Kuilsririver update (JNES 2019); Princessvlei IA (TEP 2019); Koeberg Servitude maintenance inputs (Koeberg 2017), Koeberg NPS water tanks (Doug Jeffery Enviro 2016); De Grendel SDF inputs (Footprint 2015); Eersterivier erven baseline (dbas 2015); Eskom Ankerlig – Sterrekus powerline walkdown (Eskom 2015); Welbeloond survey (Headland 2015); Wolwerivier baseline (TEP 2014); De Mitchells Plain & Brentwood Park scans (TEP 2014); CoCT BioSolids Beneficiation IA, Vissershok (RMS; 2013); De Grendel 24G study (De Grendel; 2013); Koeberg Visitors Centre constraints study (Stauch Vorster; 2013); Protea Ridge IA, Kommetjie (Doug Jeffery; 2013); Delft Sand Mine (EnviorSci Africa; 2012); Atlantic Beach study (Kantey & Templer; 2012); Ocean View Erf 5144 updated baseline (GNEC; 2011); Ocean View infill housing BA (I. Terblanche & Associates; 2010), Oakhurst farm, Hout Bay (SEC 2010); Protea Ridge Corridor study (Doug Jeffery; 2009); Oudekraal botanical constraints study (Doug Jeffery 2009); Mitchells Plain hospital site (Doug Jeffery; 2006, 2008); Eerste River Erf 5540 (CCA 2008); Eerste River Erf 5541 (EnviroDinamik 2008); Kommetjie Riverside IA (Doug Jeffery 2008); Strandfontein Road widening (CoCT 2008); Pelikan Park IA (CoCT 2008); Blue Downs Erf 1897 (Environmental Partnership 2008); Driftsands NR Sensitivity Study (CapeNature 2006); Assessment of Driftsands South (Environmental Partnership 2006); Woodgreen housing Mitchell's Plain (CCA; 2006).

CONDITIONS RELATING TO THIS REPORT:

The methodology, findings, results, conclusions and recommendations in this report are based on the author's best scientific and professional knowledge, and on referenced material and available knowledge. Nick Helme Botanical Surveys and its staff reserve the right to modify aspects of the report, including the recommendations and conclusions, if and when additional relevant information becomes available.

This report may not be altered or added to without the prior written consent of the author, and this also applies to electronic copies of this report, which are supplied for purposes of inclusion in other reports, including in the report of EAPs. Any recommendations, statements or conclusions drawn from or based on this report must cite this report, and should not be taken out of context, and may not change, alter or distort the intended meaning of the original in any way. If these extracts or summaries form part of a main report relating to this study or investigation this report must be included in its entirety as an appendix or separate section to the main report.

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1. INTRODUCTION

This Plant Species Impact Assessment was requested to inform the development planning and environmental authorisation process being followed by the developers of the Cape Winelands Airport (CWA) site, some 6km northeast of Fisantekraal, and centred on the old Fisantekraal airfield. The total current study area is now about 470ha, with the proposed airside layout being about 172ha and the landside layout is about 152ha, making a total footprint of about 324ha (see Figure 1). The study area is largely surrounded by agricultural land. The applicant has proposed to purchase agricultural land to the east of the main project area, after project approval, as shown in Figure 2, and this approximately 412ha area will be managed primarily for ongoing agriculture, as well as some wetland offset rehabilitation and plant species conservation. The preferred development layout is now known as Alternative 4 (see Figure 1).

Three alternatives were provided for assessment:
1) The No Go (Alternative 1) – which would be development of the current airport within its current rights only (presumably with no major footprint change, but this is not known)
2) Alternative 2 (the preferred alternative in the Scoping report) with 2 runways in Phase 1 and one runway in Phase 2
3) The Preferred Alternative 4 (which has been amended to exclude the cross runway within the Phase 1 SDP) and has one runway in Phase 2.

As there is no significant difference between Alternatives 2, 3 and 4 in terms of development footprints within any areas of botanical sensitivity they can be considered as identical for purposes of this assessment, and the assessed footprint is as shown in Figure 1.

Figure 1: Satellite image showing the study area and proposed Alternative 4 layout as of Jan 2025.

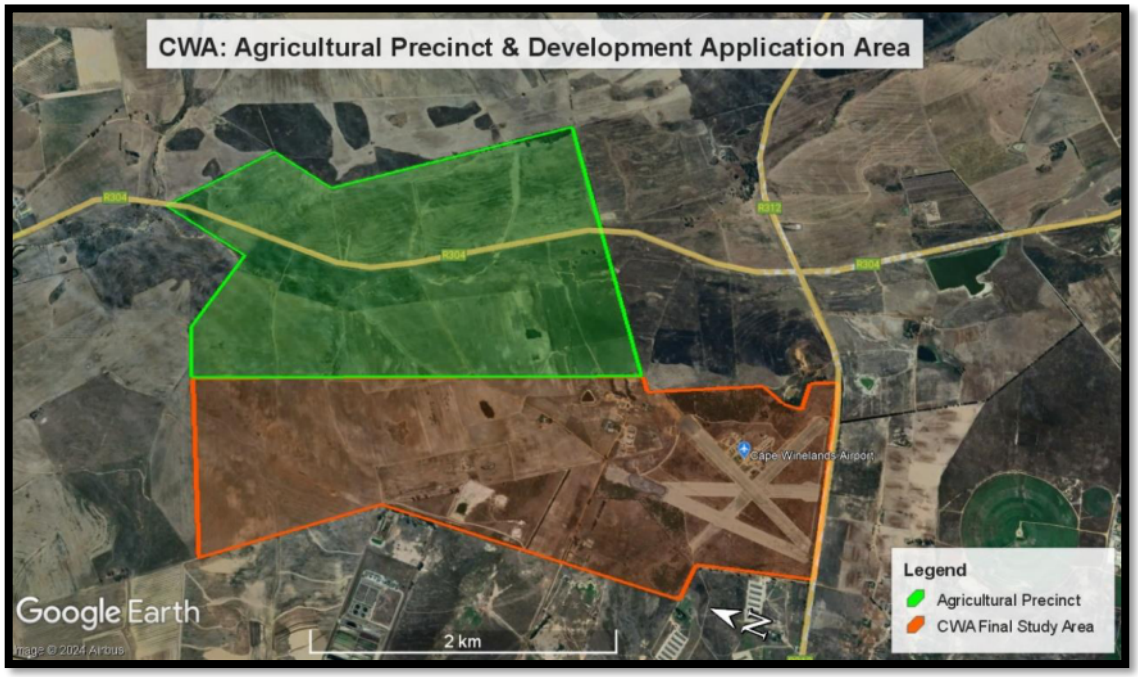

Figure 2: Satellite image showing the CWA project area plus the agricultural precinct to the east that will be bought by the applicant but which will managed primarily for continuing agriculture, but also with some wetland offset rehabilitation and plant species conservation.

2. TERMS OF REFERENCE

The terms of reference for this study were as follows:

- Draw on previous botanical sensitivity studies undertaken for the study area (Helme 2020 & Helme 2022)
- Identify and describe the vegetation in the study area and place it in a regional context, including its status in terms of the relevant CoCT Spatial Biodiversity Plans (CBA/ESA/ONA, etc)
- Identify and locate any (likely) plant Species of Conservation Concern in the study area, based on observation, literature and iNaturalist website review
- Provide an overview of the botanical conservation significance (sensitivity) of the study area
- Identify the likely direct, indirect and cumulative impacts of the proposed project and the No Go (No development) alternative on the vegetation on the site, and provide an assessment of the likely impacts, using standard IA methodology
- Identify any Fatal Flaws and/or any significant impacts that may require biodiversity offsets to mitigate unavoidable residual impacts, and provide an outline of what these offsets may involve.
- Provide feasible mitigation measures to avoid or reduce impacts to below the limits of acceptable change, including requirements for ongoing ecological management of key areas, plant Search and Rescue, etc .
- Report must comply with all biodiversity specialist reporting requirements, as per NEMA, etc.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

The site was initially visited on 7 August 2020, and then again in September 2021 (original study areas only) and March 2022 (additional study areas only), with some areas visited again in June 2024. The first two site visits were within the optimal winter – spring flowering season in this winter rainfall area, and all the likely geophytes were thus evident, and most but perhaps not all the possible annuals were evident and identifiable, whilst all perennial plants were identifiable. The seasonal constraints on the accuracy of the botanical findings were thus minimal. The March 2022 site visit was in the dry season, and thus although there were significant seasonal constraints on species observations, the focus was on habitat integrity, and the seasonal constraints were less important. Numerous perennials were anyway identifiable in the two small areas with natural vegetation

during the March site visit, allowing for an accurate assessment of habitat sensitivity. Most of the agricultural precinct was not surveyed, except for the northern corner (surveyed Mar 2022), as this was not confirmed as being part of the study area until late in this EIA process (2024). The author has undertaken extensive work within the region, which facilitates the making of local and regional comparisons and inferences of habitat quality and conservation value. Key constraints possibly compromising the botanical findings were the lack of recent fire (<15 years) throughout most of the study area, with the result that some species may have been dormant or confined to underground seedbanks (and thus missed during the surveys), and the dense alien invasive vegetation throughout most of the site during the initial survey in 2020, which made it difficult to physically see into or easily enter many areas, and also made the interpretation of satellite imagery less accurate than usual. Confidence in the accuracy of the initial findings was deemed to be medium to high in 2020, but is now high, as a result of the alien vegetation management undertaken since 2019, and the two subsequent site visits. It is noted that a number of plant Species of Conservation Concern (both individuals and species) may have been missed due to the reasons outlined above, and this may have resulted in an underestimate of the actual botanical sensitivity of those areas.

Various transects within the study area were walked, and all available tracks were driven, during which all plants and animals on site were noted. Satellite imagery dated January 2023 (and earlier, including July 2009 and July 2020) was used to help inform this assessment, and for mapping.

The botanical sensitivity of a site is a product of plant species diversity, plant community composition, rarity of habitat, degree and type of habitat degradation, rarity of species, ecological viability and connectivity, restorability of habitat, vulnerability to impacts, and reversibility of threats.

As there is no significant difference between Alternatives 2, 3 and 4 in terms of development footprints within any areas of botanical sensitivity they can be considered as identical for purposes of this assessment, and the assessed footprint is as shown in Figure 1. The exact definition of the No Go (Alternative 1) is not known in terms of impact on vegetation, but is assumed to mean ongoing activity on the current footprints, current levels of disturbance to vegetation (including mowing of areas around hangars, random dumping and excavation), little or no alien invasive vegetation management, no ecologically based fire

management or controlled burns, no rehabilitation programs and no biodiversity offset.

It is assumed that all natural and partly natural vegetation within the proposed development footprint hard surfaced area (see Figure 1) will be permanently lost during the construction phase. It is also assumed that open space areas between the runways and taxiways will be grassed and regularly mown (for fire risk, visibility and safety), and will be of no future botanical conservation significance, as most of these areas are currently all heavily disturbed agricultural areas with low rehabilitation potential.

It is assumed that all mitigation required in terms of this study will be included in any Environmental Authorisation and timeously and adequately implemented.

4. REGIONAL CONTEXT OF THE VEGETATION

The study area is part of the West Coast Renosterveld bioregion (Mucina & Rutherford 2006), and is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009). It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The West Coast Renosterveld bioregion is characterised by relatively high winter rainfall, strong rainfall gradients, rich soils, low topographic diversity, large urban areas, intense agriculture and high levels of alien invasive vegetation. Due to this combination of factors the loss of natural vegetation in this bioregion has been extremely severe (>90% of original extent lost within the region), and the

bioregion has an extremely high number of threatened plant species - and is in fact amongst the highest concentrations of threatened plant species anywhere on the planet (Raimondo *et al* 2009). The lowland regions of the Cape metropole (stretching from Atlantis in the north, southeast to near Somerset West), generally known as the Cape Flats, and biological diversity in this area is under enormous pressure. The area has been described as a "conservation mega-disaster" (Rebelo *et al* 2011), in terms of the number of severely threatened plants (some already extinct) and habitats within the area. The study area lies just outside the northeastern fringes of what is normally considered the "Cape Flats".

The City of Cape Town's Biodiversity Network (Holmes *et al* 2016, 2024 update) indicates that four categories were mapped in the study area (see Figure 3). The highest priority is mapped as "CBA1a; Selected irreplaceable high or medium condition site" (four patches, about 8ha in total), followed by areas mapped as "CBA1c; Selected irreplaceable low condition site". The majority of the mapping is "No Natural Habitat; irreversibly modified". The 2024 BioNet update mapping in this area is based on ground-truthing for the current study and is thus supported.

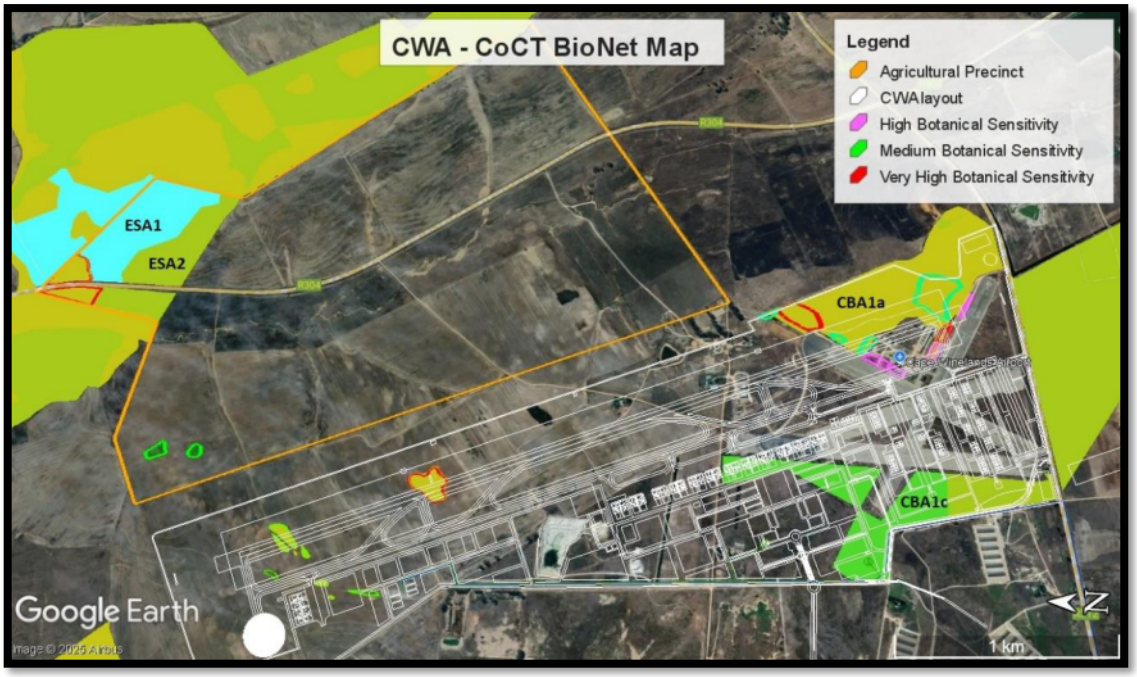

Figure 3: Extract of City of Cape Town Biodiversity Network (2024) showing the four categories mapped in the study area. The highest priority is mapped as "CBA1a; Selected irreplaceable high or medium condition site", followed by areas mapped as "CBA1c; Selected irreplaceable low condition site". The majority of the mapping is "No Natural Habitat; irreversibly modified".

5. THE VEGETATION IN THE STUDY AREA

According to the SA Vegetation Map three different vegetation types would have occurred in the study area before human disturbance (see Figure 4), but I am not fully in agreement with the actual mapping, based on my groundtruthing of the site. I would prefer to categorise the northernmost remaining patch of vegetation as **Swartland Silcrete Renosterveld**, which is Critically Endangered on a national basis (Government of South Africa 2022).

Swartland Granite Renosterveld would have covered most of the site, and is regarded as **Endangered** on a national (Government of South Africa 2022) and regional basis (Holmes *et al* 2008). Less than 20% of its total original extent remains intact, less than 1% is conserved, and the national conservation target is 26% (Rouget *et al* 2004). The unit is known to support a very large number of plant Species of Conservation Concern (Raimondo *et al* 2009), many of them being bulbs (geophytes) or succulents, and occurs on fertile shale derived soils in the lowland region from Darling to Somerset West. This vegetation type needs regular fire for optimal ecological functioning (Helme & Rebelo *et al* 2016).

Swartland Shale Renosterveld would have covered about 15% of the greater study area according to the SA vegetation map, and is regarded as **Critically Endangered** on a national basis (Government of South Africa 2022) and regional basis (Holmes *et al* 2008). Less than 10% of its total original extent remains intact, less than 1% is conserved, and the national conservation target is 26% (Rouget *et al* 2004). The unit is also known to support many plant Species of Conservation Concern (Raimondo *et al* 2009), and occurs on shale derived soils in the lowland region from Piketberg to Somerset West. This vegetation type also needs regular fire for optimal ecological functioning (Helme & Rebelo *et al* 2016).

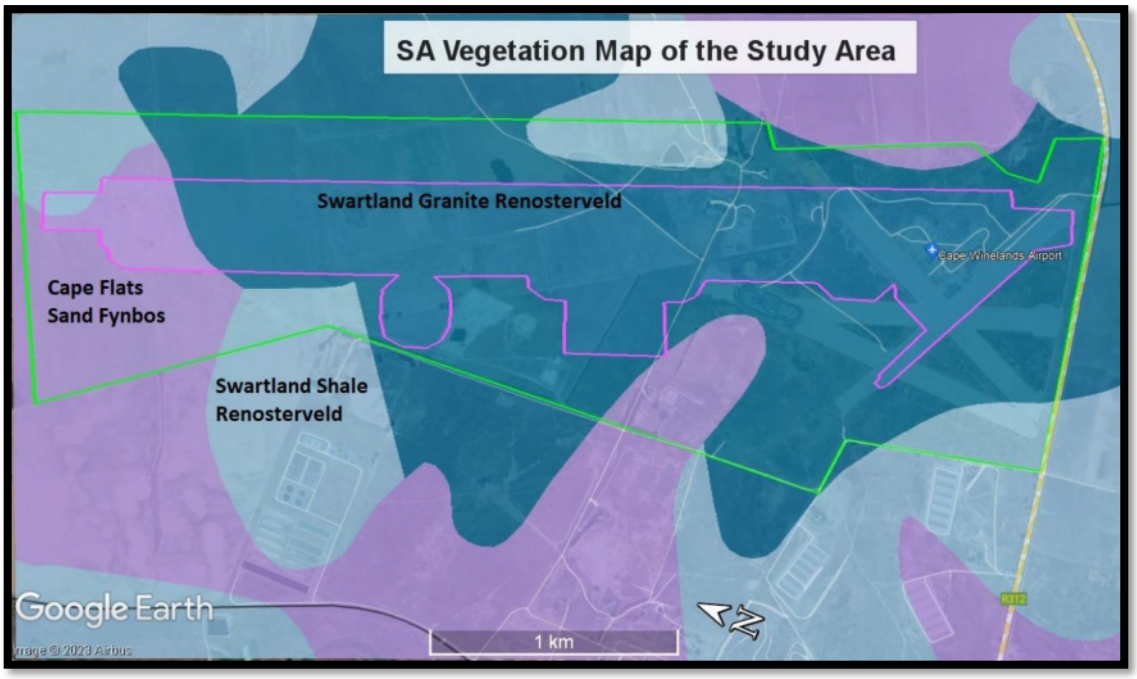

Figure 4: Extract of the SA Vegetation Map (Mucin & Rutherford 2012) showing that three different vegetation types would originally have occurred in the primary study area (excluding the Agricultural Precinct), with Swartland Granite Renosterveld making up the bulk of the site. The green polygon is the study area, and the pink polygon is the airside development footprint.

Cape Flats Sand Fynbos is also regarded as **Critically Endangered** on a national (Government of South Africa 2022) and regional basis (Holmes *et al* 2008). Less than 19% of its total original extent remains intact, less than 1% is conserved, and the national conservation target is 30% (Mucina & Rutherford 2006). The unit is also known to support a very large number of plant Species of Conservation Concern (Raimondo *et al* 2009), and occurs on acid sands on the lowlands between Atlantis and False Bay. This vegetation type also needs fire for optimal ecological functioning, and has the lowest rehabilitation potential of the vegetation types on site (Helme *et al* 2016).

Plate 1: Heavily degraded area in western half of original study area, with invasive alien Port Jackson (*Acacia saligna;* prior to clearing in 2021) and an understorey of alien annual oat grasses (*Avena*). This area is of Low botanical sensitivity.

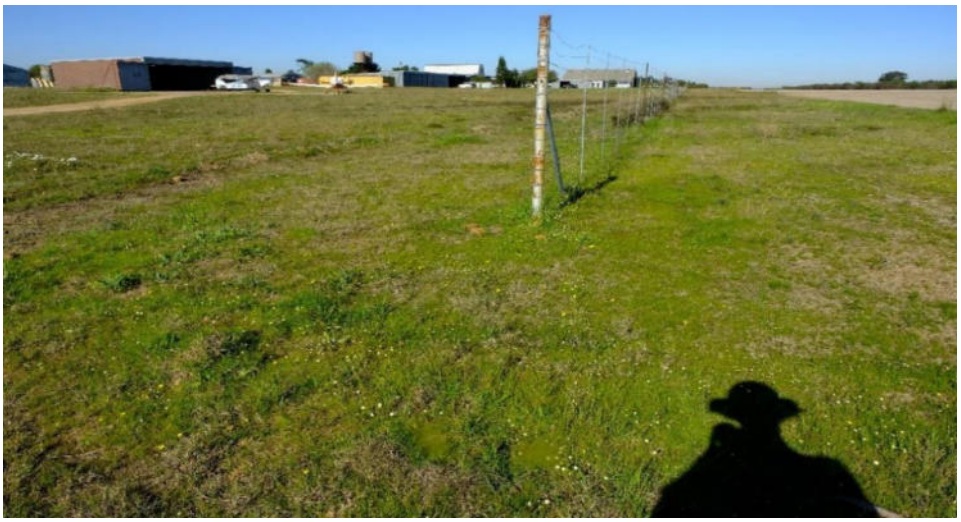

Plate 3: Brushcut meadow area between hangars and the runway, with fairly high diversity of bulbs and annuals, in seasonally damp loamy soils. Woody alien invasives have been kept out of this area, and the vegetation is now of Medium and High botanical sensitivity.

Plate 3: The tall, silvery shrub in the centre is the Critically Endangered *Leucadendron verticillatum* (Klapmuts Conebush), and this is the only place on site where it occurs – just east of the northern end of the old runway. An important and still viable population of this very rare species survives here in what was dense alien Port Jackson (*Acacia saligna;* prior to partial clearing of aliens here in 2021). This 1.6ha area is one of the two highest conservation priority patches in the study area (Very High sensitivity), and should be properly cleared of aliens and then burned the following autumn, and should be formally conserved. The area lies just east of the southern part of the main proposed runway (RESA), and half within the project area and half within the Agricultural Precinct (see Figure 2).

Plate 4: Late summer view of Very High sensitivity patch of remnant koffieklip vegetation (Swartland Silcrete Renosterveld) in the northern area, looking southeast. This 1.6ha patch is surrounded by cultivated lands, and falls partly

within the northern part of the proposed runway, and is thus the only Very High sensitivity area that will be lost to the proposed development.

There was (and still is, in the form of seedlings) a high to very high density of woody alien invasive vegetation in most of the original study area, comprising mostly *Acacia saligna* (Port Jackson; see Plates 1), but also with occasional *Leptospermum laevigatum* (Australian myrtle), *Pinus* sp. (Pines) and *Eucalyptus* sp. (gums). Total woody alien invasive vegetation cover ranged from 50% to 100%, with an average overall of about 75%, prior to clearance of most of the original study area in late 2020 and early 2021. The biocontrol fungus has infected most of the Port Jackson, and is reducing seed set and even killing some of the plants, but even if all above ground specimens are removed there is likely to be a massive seedbank that would germinate after fire or similar clearing (which has proven to be the case). Nearly all the dense woody alien invasive cover is a response to previous soil disturbance, which may have included cultivation, followed by ferricrete quarrying in places, and extensive disturbance associated with development and maintenance of the airfield. Even the small areas seemingly not disturbed by any of the above have been invaded by aliens, simply as a result of seed dispersal.

As expected in such a disturbed area the understorey is also often dominated by alien invasive herbs and grasses, such as *Plantago lanceolata* (ribwort plantain), *Echium* spp. (Patterson's curse), *Erodium* spp. (cranesbill), *Lolium* spp. (ryegrass) and *Avena* (wild oats).

Surprisingly, most of the original study area has not been burnt in the last 14-25 years (as judged by the vegetation on site, and by historic satellite imagery going back to 2004), and much of the indigenous vegetation can thus be considered due or overdue for a fire, as Renosterveld is a fire driven vegetation type (Helme & Rebelo 2016), requiring fire once every 8-12 years for optimal ecological functioning. In the absence of fire for more than 15 or 20 years evident (above ground) plant species diversity can be expected to drop off quickly, but can bounce back quite dramatically after a fire (from soil stored seedbanks).

There is no indigenous plant cover in the large cultivated areas in the additional study area, comprising about 80% of the total study area.

Indigenous plant diversity is very low in the most disturbed parts of the original study area, and is low overall, compared to pristine Renosterveld, which would have at least 250 species in a site of this size (if pristine). However, the least disturbed areas of Medium, High and Very High sensitivity have increasingly high levels of indigenous plant diversity, with an overall total of about 50 species recorded in the original study area. An additional 10 plant species were recorded in the additional study area in March 2022, taking the site total up to about 60 plant species.

Indigenous plants species recorded in the original, primary study area include *Cliffortia juniperina, C. ruscifolia, Trachyandra falcata, Hermannia cuneifolia, Cotula turbinata, Gladiolus carinatus, G. watsonius, Aspalathus ericifolia, Passerina corymbosa, Athanasia trifurcata, Ursinia anthemoides, Anthospermum spathulatum, A. aethiopicum, Muraltia trinervia, Thesium* sp.*, Oxalis purpurea, O. pes-caprae, O. glabra, O. versicolor, Eriocephalus africanus, Holothrix villosa, Tribolium uniolae, Phylica plumosa, Aspalathus* sp.*, Restio rigoratus, Lampranthus leptaleon, Pauridia aquatica, Otholobium hirtum, Euclea acutifolia, Osteospermum monstrosum, Searsia laevigata, Ornithogalum thyrsoides, Moraea flaccida, Dimorphotheca pluvialis, Babiana odorata, Leucospermum grandiflorum, Leucadendron verticillatum, Restio duthieae, Eragrostis curvula, Helichrysum* sp.*, Wachendorfia paniculata, Moraea fugacissima, Gnidia laxa, Aristea africana, Cynodon dactylon, Romulea flava, Erica quadrangularis, Metalasia densa, Xiphotheca lanceolata, Drosanthemum hispifolium, D. asperulum, Pterygodium* sp.*, Lobostemon fruticosus, Pelargonium myrrhifolium* and *Moraea gawleri*.

Additional indigenous species noted in the additional (northern) study area in March 2022 include *Lichstensteina obscura, Gymnosporia buxifolia, Pelargonium hirtum, Haemanthus pubescens, Ficinia* sp. nov.*, Tylecodon grandiflorus, Brunsvigia orientalis, Podalyria microphylla* and *Aspalathus linguiloba,* plus at least 14 plant Species of Conservation Concern (SoCC), listed in Table 1.

5.1 Plant Species of Conservation Concern

Eleven plant Species of Conservation Concern (SoCC) were recorded during the initial survey of the main project area in 2020 (Table 1), a surprisingly high number given the degraded nature of the vegetation on most of the original study area. An additional 14 SoCC were added during the March 2022 survey of the additional study area, most of which are found only in the northern part of the Agricultural Precinct. 25 SoCC in any area is a very significant total, and

especially so when in such a generally degraded area. All SoCC were recorded only in areas mapped as being of Very High botanical sensitivity.

The possibility of there being various other undetected SoCC on site is moderate, given the difficulty of finding species in the dense alien vegetation that dominated much of the project area, and the lack of fire on site in the last ten years. Many of the SoCC recorded have regionally insignificant populations on site (being too small). The Screening Tool include a large number of other SoCC that may occur in the general area, but I am satisfied that they do not occur in the remnant patches of natural habitat in the study area, and there are no historical records that any of these occur on site (at least since 1950 and the primary disturbance period) either.

All of the SoCC were recorded in the mapped areas of Medium, High and Very High botanical sensitivity, with the ones of highest significance in the latter areas (Figures 4 & 5).

Species	**Redlist Status**	**Comments**
Aspalathus aculeata	Vulnerable	About 50 plants in northern part of Agric Precinct; medium significance
Babiana odorata	Endangered	About 10 plants close to entrance gate; medium significance
Cephalophyllum parviflorum	Critically Endangered	About 30 plants in northern part of Agricultural Precinct; very high significance
Diosma aspalathoides	Near Threatened	About 20 plants in northern part of Agric Precinct; medium significance
Drosanthemum hispifolium	Vulnerable	About 10 plants on northern edge; medium significance
Ficinia sp nov.	Not yet assessed	Rare in ferricrete patch in northern area; also in northern part of Agricultural Precinct; high significance
Gladiolus watsonius	Near Threatened	About 30 plants in se area; medium – high significance
Lampranthus leptaleon	Endangered	Only 3 plants in se area; medium significance
Lampranthus sociorum	Endangered	Over 200 plants in northern part of Agric Precinct; high significance
Lampranthus spiniformis	Vulnerable	Over 200 plants in northern part of Agric Precinct; high significance
Leucadendron stellare	Endangered	About 12 plants in northern part of Agric Precinct; high significance

Leucadendron thymifolium	Endangered	4 plants in northern part of Agric Precinct; high significance
Leucadendron verticillatum	Critically Endangered	About 60 plants NE of old runway; very high significance
Leucospermum grandiflorum	Endangered	Two dead plants near entrance gate; medium significance
Metalasia octoflora	Vulnerable	Single plant in northeast of original study area; low significance
Muraltia macropetala	Vulnerable	Scattered plants in east; medium significance
Muraltia trinervia	Near Threatened	5 plants in se area of original study area and about 10 plants in northern part of Agric Precinct; low significance
Nenax hirta ssp. *hirta*	Vulnerable	About 30 plants in northern part of Agric Precinct; medium significance
Oedera fruticosa	Near Threatened	About 50 plants in northern part of Agric Precinct; medium significance
Podalyria microphylla	Critically Endangered	About 40 plts in northern Very High sensitivity ferricrete patch; high significance
Restio duthieae	Vulnerable	Single plant on northern edge or original study area; low significance
Restio rigoratus	Endangered	About 50 plants; mainly in se of original study area; medium significance
Ruschia geminiflora	Vulnerable	About 200 plants in northern part of Agric Precinct; high significance
Ruschia umbellata	Data Deficient	Northern part of Agric Precinct; about 10 plants; high significance
Xiphotheca lanceolata	Vulnerable	Single plant on northern edge of original survey area and 8 plants in northern part of Agric Precinct; low significance

Table 1: List of the 25 plant Species of Conservation Concern recorded in the study area (including in the Agricultural Precinct, as per Figure 2; status according to redlist.sanbi.org). Occurrences of High and Very High significance are highlighted.

6. BOTANICAL SENSITIVITY

About 93% of the total study area is deemed to be of Low botanical sensitivity, with a total of 7% being of Medium, High or Very High botanical sensitivity (see Figures 5 & 6).

Two patches of Very High sensitivity have been mapped in the primary study area (Figure 6), and another two in the Agricultural Precinct (see Figure 5). The patch

closest to the airport infrastructure (1.6ha; Figure 6) is anchored by the important population of *Leucadendron verticillatum* (Critically Endangered; Klapmuts Conebush; about 60 plants), but other SoCC present in this area are *Drosanthemum hispifolium, Xiphotheca lanceolata* and *Restio duthieae*. This is probably the only part of the primary study area not previously cultivated or quarried, and lies just east of the proposed development footprint.

The second Very High sensitivity patch is in the northern area (1.6ha), unfortunately at least partly (maybe 30-50%, depending on plan shown) within the proposed runway alignment (Figures 2 & 5). This patch is best classified as Swartland Silcrete Renosterveld, a Critically Endangered vegetation type. This ferricrete outcrop supports a large population (and the only one on the primary study area) of *Podalyria microphylla* (Critically Endangered), along with at least six plants of what is currently thought to be an undescribed species of *Ficinia* (Prof M. Muasya – pers. comm). This sedge was first discovered by the author near Joostenberg Hill, some 3km to the southeast, and thus appears to be a rare and local endemic, and was also found in the northern part of the Agricultural Precinct.

The patches of High sensitivity, all in the original study area, are brushcut "lawns" in front of the hangars (see Plate 3), plus three patches near the main gate, two brushcut and one not. These areas could arguably be mapped as Medium sensitivity, but the relatively high species richness has elevated their sensitivity rating. The brushcut areas have been kept clear of woody aliens (by mechanical and chemical control), but the brushcutting does mean that there are no indigenous shrubs either, and the plant community is thus dominated by seasonal annual and bulbs, but is species rich and of conservation value. There are substantial woody alien seedlings in the area that is not brushcut, near the main gate. A young, flowering plant of *Leucospermum grandiflorum* (Endangered) was present in one of these area in June 2021, and one dead plant of this species (evidently killed by the brushcutting) was observed. However, the living plant had been mowed and was dead in Sep 2021. The area also supports a fairly high diversity of bulbs and annuals, but is largely likely to fall within the development footprint.

The ten patches of Medium sensitivity are more degraded from a soil perspective than the High and Very High sensitivity areas, mostly from quarrying, grazing and trampling, fertilizer runoff, and runway maintenance earthmoving, but still

support moderate indigenous plant diversity, especially in the largest patch and in the brushcut patch closest to the hangars (but again, without shrubs in this latter area).

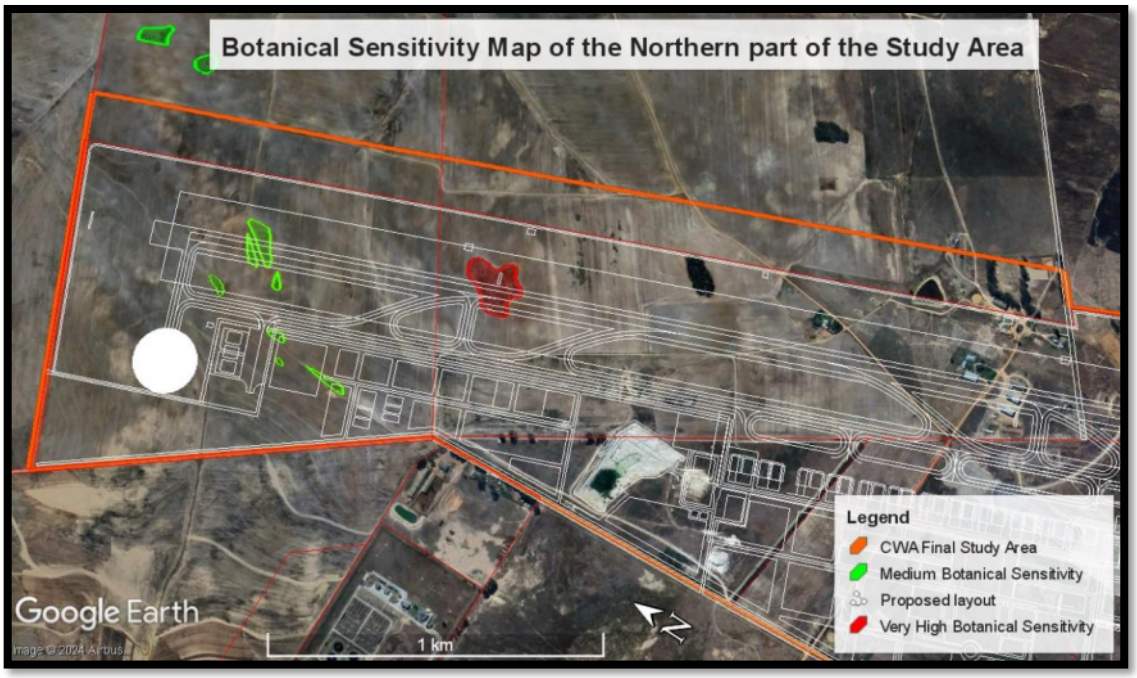

Figure 5: Botanical sensitivity map for the northern part of the study area. All areas not shaded green or red within the study area are of Low botanical sensitivity.

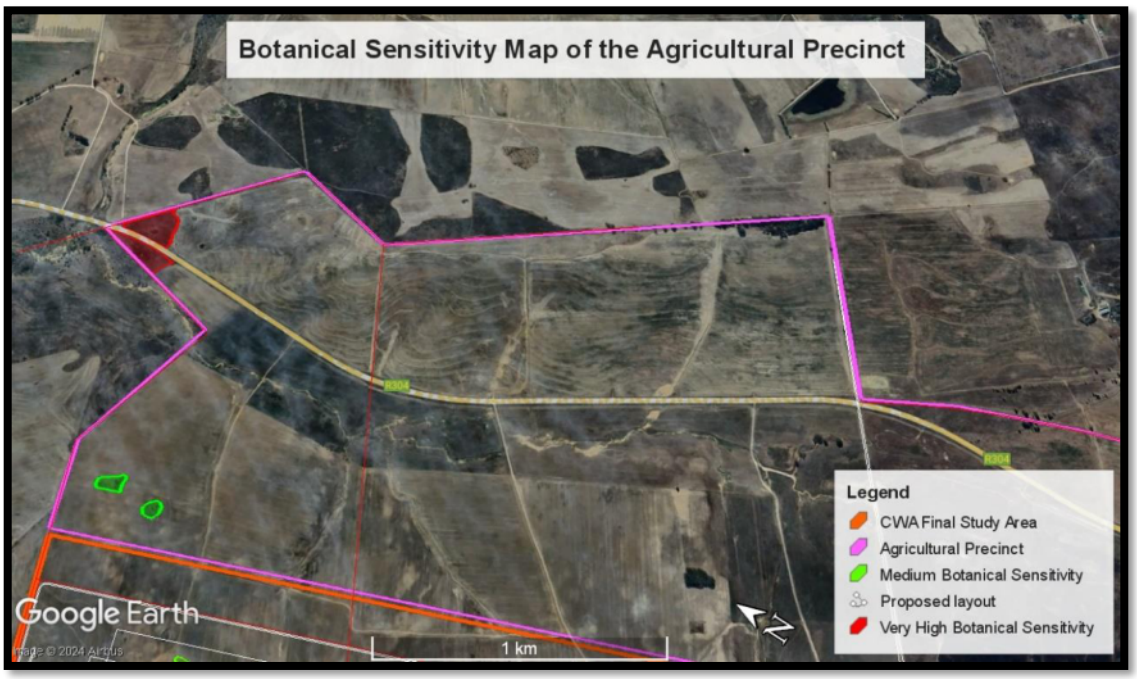

Figure 5a: Botanical sensitivity map for agricultural precinct part of the latest study area. All areas not shaded green or red within the precinct are of Low botanical sensitivity.

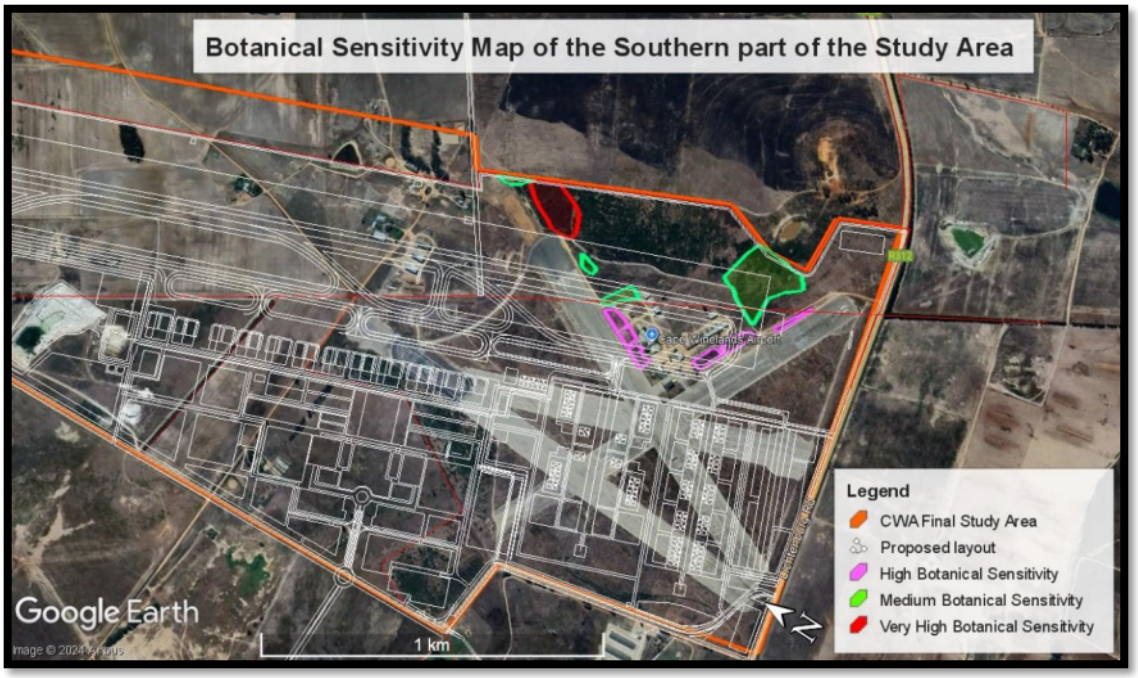

Figure 6: Botanical sensitivity map for the southern part of the study area. All areas within the study area not shaded green, red or pink are of Low sensitivity.

The largest Medium sensitivity area in the southern section of the original primary study area (but now excluded from the primary project area) also features two seasonal ponds in old ferricrete excavations, and both ponds support the bulbs *Pauridia aquatica* (White Pond Stars) and breeding *Strongylopus grayii* (Clicking Stream Frogs).

7. IMPACT ASSESSMENT

7.1 Construction Phase Impacts

In terms of this assessment the proposed development" means either Alternative 2 or 3.

The main construction phase botanical impact of the proposed development is loss and degradation of the remaining natural and partly natural vegetation in some of the development footprints (see Figure 4).

It is likely that about 1.0ha of the 1.6ha patch of Very High sensitivity in the north will be lost, along with the two associated plant Species of Conservation Concern in this area. About 1.3ha of High sensitivity vegetation will be lost, and about 2.7ha of Medium sensitivity vegetation will be lost. Thus a total of about

5ha of vegetation of some sensitivity will be lost, with all the rest being of Low sensitivity (generally heavily disturbed or cultivated).

Only three of the 25 recorded plant Species of Conservation Concern in the study (and Agricultural Precinct) area will be lost to the proposed development footprint, one of which already seems to be extinct on the site (*Leucospermum grandiflorum*).

The overall botanical construction phase impact of the proposed development is likely to be **Medium – High negative before mitigation**, driven mainly by the partial loss of a 1.6ha patch of Very High sensitivity Swartland Silcrete Renosterveld (Critically Endangered), and the two associated plant Species of Conservation Concern in this area. This impact is largely unavoidable, other than by runway layout alteration. **After mitigation** this could be reduced to an acceptable **Medium negative level, or even Low negative**, if adequate ecological management of the priority remaining natural areas is implemented, along with an appropriate biodiversity offset.

The **No Go alternative** (Alternate 1) is likely to have a **Low negative** botanical impact, but with a low degree of certainty, with construction phase impacts arising from mowing, some new building, and possible random excavation and dumping.

Development Alternative	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
Proposed infrastructure	Local and regional	Permanent and temporary to long term	High to Low	Definite	High	Medium to High -ve	Low to Medium -ve
No Go	Local	Unknown and variable	Low negative	Unknown	Possible	Low negative	Low negative

Table A: Summary table for construction phase botanical impacts associated with the proposed development and the No Go alternative. The primary construction phase impacts of the proposed development would be permanent to long term loss of partly natural vegetation in about 5ha of Medium, High and Very High sensitivity habitat, plus loss of site populations of at least two extant plant Species of Conservation Concern (and a possible third locally extinct one).

7.2 Operational phase botanical impacts

Operational phase impacts will take effect as soon as the partly natural vegetation on the site is lost or disturbed, and will persist in perpetuity, or as long as the area is not rehabilitated (to approximately the current state). Operational phase impacts include reduction of the current low - moderate levels of ecological connectivity across the study area, and associated habitat fragmentation. The airside open space areas will need to be brushcut and mown to various heights (from 200mm to 700mm), to comply with safety regulations, and also to minimise potential bird-strikes. This regular mowing will obviously have a negative physical effect on the plants, but most of them should survive, although they will remain stunted, and may not flower or set seed, depending on the timing of the mowing.

The Landscape Concept Plan (Planning Partners 2024) indicates that a suitably low growing (depending on location) mix of indigenous annuals, vygies, herbs and low shrubs will be hydroseeded and planted in most of the airside open areas. If this is even partly successful it could actually enhance the current low indigenous plant diversity in these areas.

Once construction is completed the overall change in ecological connectivity is likely to be **Low to Medium negative** on a regional scale.

Some fire related changes are likely, but assessing these is difficult, as the No Go implies very infrequent fires, which may also be the case going forward, unless managed and mitigated (in the conservation worthy areas at least). Post mitigation, and with proper fire management being implemented in the conservation areas, the operational phase impact of this should be **Low positive.**

Overall the operational phase botanical impacts of the proposed development are likely to be **Low to Medium negative** at a local scale, before mitigation, and **Neutral to Low negative** after mitigation.

The **No Go** alternative would possibly have a slightly lower indirect (operational phase) ecological impact than the proposed development, and is likely to be **Low negative** (before and after mitigation). Impacts would be expected from unmanaged alien invasive vegetation, lack of ecological fire management and ongoing mowing.

Development Alternative	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
Proposed development	Local and regional	Permanent	Low to Medium	Likely	Very Low	Low to Medium -ve	Neutral to Low -ve
No Go	Local and regional	Permanent	Low	Likely	Low	Low negative	Low negative

Table B: Summary table for operational phase botanical impacts associated with the proposed development and the No Go alternative.

7.3 The No Go Alternative

The No Go alternative (continuation of the *status quo)* on site would have clearly lower construction phase botanical impacts (Low negative) than the proposed development (Alts 2, 3 and 4), and would thus technically probably be the slightly preferred alternative from an ecological perspective. However, at the operational phase of the proposed development some positive impacts could be realised on the remaining conservation worthy areas, and via the required biodiversity offset, and thus the development alternatives would have a more positive botanical impact than the No Go at this stage.

No biodiversity offset would be implemented in the No Go alternative, which thus means that the very positive impacts of this aspect would not be realised. This is an important difference, as the implementation of an appropriate biodiversity offset would be very positive for Renosterveld conservation in the region.

The status quo, prior to the CWA taking over the site, was unmanaged, dense alien invasive vegetation, in all areas except those actively used or bordering the airfield, and this was clearly having a negative botanical impact, as was the mowing of the grassy areas around the hangars (notably the loss of the *Leucospermum grandiflorum*).

7.4 Cumulative Impacts

The cumulative botanical impacts are in many ways equivalent to the regional ecological impacts, in that the vegetation type/s likely to be impacted by the proposed development have been, and will continue to be, impacted by numerous

developments and other factors (the cumulative impacts) within the region. The primary cumulative impacts in the region are loss of natural vegetation and threatened plant species to ongoing agriculture, urban development and alien plant invasion (Mucina & Rutherford 2012; Helme & Rebelo 2016).

The overall cumulative ecological impacts of the proposed development at the local scale are likely to be Low to Medium negative prior to mitigation, given the fairly small area of High or Very High sensitivity vegetation to be impacted (<3ha). After mitigation, and with implementation of an appropriate offset, and on site management of the remaining conservation worthy areas, this could be reduced to Neutral or even Low positive.

7.5 Positive Impacts

No significant positive ecological impacts of the proposed development are likely during either the construction or the operational phase in the absence of mitigation. However, the alien invasive vegetation management already undertaken on site has had a minor positive impact, and will hopefully continue (and will be included in the EMPr for both the primary project area and the Agricultural Precinct). If the required environmental management of the natural areas on site is properly implemented, and if the required biodiversity offset is secured, then the proposed development could have a notable positive botanical impact on a regional scale (in contrast to the No Go alternative), even taking into account the loss of patches of sensitive habitat on site.

8. MITIGATION REQUIREMENTS

The following mitigation is considered feasible, reasonable and essential, and is factored into this assessment:

- All Very High, High and Medium sensitivity areas (as per Figures 5, 5a & 6) that do not fall within the authorised development (construction) footprint (as per Figure 1) must become part of the on-site conservation areas and managed as such on an ongoing basis, according to the EMP that must be prepared for these areas. Two of the Very High sensitivity areas are within the Agricultural Precinct, whilst the other two are within the Airside Precinct.
- All authorised hard infrastructure bordering on any of the mapped areas of Very High, High and Medium sensitivity botanical areas must be surveyed and fenced off prior to any site preparation, clearing or construction. These

sensitive areas may not be disturbed in any way during the construction process. Fences should be marked with signage every 15m indicating that these are No Go areas, and all contractors must be made aware of such, starting with and including in their contract quotation requests. Where the perimeters of these areas lie within 20m of the RESA (runway clearance area) they should be buffered by an ecological buffer area at least 5m wide that is not disturbed by any earthmoving or development.

- No perimeter service road may cross or disturb the mapped area of Very High sensitivity east of the main runway, as shown in some of the most recent plans. This road must be rerouted east of this Very High sensitivity area, and final plans should be amended to show that this has been implemented.
- An EMP for the remaining conservation worthy areas on site (all remaining areas of Very High, High and Medium botanical sensitivity, including all such areas within the Agricultural Precinct, see Figure 5b) should be drawn up, with input from the botanist, and management of these areas could be outsourced to the CoCT Environmental Management Department, provided that the applicant covers all ongoing management costs.
- All invasive alien vegetation in the conservation areas on site must be removed within one year of any project approval, using appropriate methodology (see Martens *et al* 2021), by qualified personnel. Ongoing annual alien vegetation removal must be undertaken.
- No spraying of herbicide should be undertaken in any conservation areas.
- Once all alien invasive vegetation has been removed from the conservation areas all these areas must be subject to planned (controlled) burn regimes, as this vegetation needs fire for optimal ecological functioning. The two Very High sensitivity areas are the priority areas for ecological burns, which must be undertaken in the ecologically optimal end of summer period (Feb – Mar). These burns should be professionally managed.
- Prior to the controlled burn firebreaks should be brushcut by hand around the perimeter of the sensitive areas (not within them) using handheld brushcutters.
- The botanically sensitive areas will need to be burnt every 8-12 years for optimum ecological functioning.

- The Very High sensitivity areas falling within the Agricultural Precinct must be fenced off and excluded from grazing and trampling by livestock (especially cattle). This must be done within 60 days of authorisation, or sooner if possible (subject to landowner negotiation).
- The condition of all Very High, High and Medium sensitivity areas (Agricultural Precinct and on site) should be monitored every year by a suitably competent botanist (or CoCT Environmental Management Dept.), and they should make recommendations for any management changes or actions (alien clearing, management burns, etc.) that are needed in order to achieve optimal ecological functioning in these areas.
- Most of the low and medium significance occurrences of plant SoCC within the proposed development footprint (as well as some of the high significance species) can be successfully translocated, and this should thus be done by experienced Search and Rescue contractors prior to any site development, with the assumption that the receiving areas will be properly managed in perpetuity as plant conservation areas. This must be done in consultation with the botanical specialist, and can proceed prior to any authorisation (provided all necessary permits and permissions are obtained).
- A plant Search and Rescue plan should be prepared (prior to any development or site clearing) by the appointed S&R contractor, the EAP and the botanist, and should outline who needs to do the work, when seed, sods and cuttings need to be collected, how they should be stored, how much should be collected, how receiving sites should be identified and prepared, and how and when the planting out should be undertaken, and who is responsible for this. Guidelines on ongoing maintenance of these areas must also be included.
- Large scale Search and Rescue of plant material from all Medium, High and Very High sensitivity areas within the development and clearing footprints must be undertaken prior to any development or disturbance of these areas, and outlined as part of an EMP for the site. Receiving areas should ideally be located within the greater study area (provided that land tenure and funding for conservation is secure in these areas), and should be areas that support some natural vegetation remnants, but that require rehabilitation intervention. This must be overseen by the botanical consultant.

- Given the Endangered and Critically Endangered status of the underlying habitats, and the level of impact (Medium – High negative before mitigation) it is required that any mapped areas of remnant habitat that are lost to development should be offset by formalised conservation of high conservation priority examples of the same habitat in the region, at the appropriate ratios (as per Dept. of Forestry, Fisheries & Environment offset guidelines, 2022). A specialist terrestrial biodiversity offset report has been completed (M. Botha 2024), and found that a terrestrial biodiversity of offset of at least 77ha is required (plus ongoing environmental management budget for this).
- The applicant, or their appointed management authority, must provide all necessary funding for all required ecological management of the site (airport site and conservation areas in Agricultural Precinct, including all Search and Rescue costs), and for the chosen and agreed biodiversity offset, in perpetuity.
- The botanist must provide input into the Landscaping Plan for the site, which must include a significant indigenous Sand Fynbos and Renosterveld appropriate plant component, in an attempt to maximise biodiversity rehabilitation, whilst adhering to the required airport safety guidelines. Areas that will not be hardened surfaces and that would benefit from rehabilitation should be hydroseeded with appropriate seed mixes, at the appropriate time (late autumn).
- Brushcutting and mowing of open airside (hydroseeded) areas at the operational phase should be timed to allow for winter growth and spring flowering and early summer fruiting of most of the indigenous plant species in these areas, and should thus not be undertaken between 1 June and 15 October, provided that this is not in conflict with operational safety.

9. RECOMMENDATIONS AND CONCLUSIONS

- The underlying vegetation types in the study area are best classified as Swartland Silcrete Renosterveld, Swartland Shale Renosterveld, Swartland Granite Renostereveld and Cape Flats Sand Fynbos, which differs somewhat to what is presented in the SA vegetation map. The only remaining habitat on site is best categorised as Swartland Silcrete Renosterveld and Swartland Shale Renosterveld. Both are listed as Critically Endangered on a national basis, and any viable and partly intact remnants are thus of high national conservation priority.

- About 93% of the study area and about 88% of the proposed development area has been heavily disturbed and degraded over a long period of time, with the result that negligible indigenous vegetation is found in these areas, and these areas are now of Low botanical sensitivity. These areas present no significant botanical constraints to development.
- Two patches of Very High botanical sensitivity have been identified in the primary study area, each of about 1.6ha in extent. The northern one (Swartland Silcrete Renosterveld) is located at least partly within the proposed development area, whilst the southern one (Swartland Shale Renosterveld) is just outside the development area.
- Two patches of Very High botanical sensitivity have been identified in the Agricultural Precinct, totalling about 3.7ha in extent
- 25 plant Species of Conservation Concern were found in the study area and Agricultural Precinct, with the most significant populations being within the four areas of Very High sensitivity. These are thus clear priorities for conservation, and would ideally not be disturbed or lost to development.
- The results of this study show only moderate congruence with the CoCT BioNet mapping of the site, which missed the small patches of importance in the northern part of the primary study area, and those around the current aircraft hangars.
- All areas of Medium, High or Very High botanical sensitivity on site that are not within the development footprints should be conserved as part of any redevelopment of this site (no development and no infrastructure through these areas), and ideally they would also all be ecologically connected via rehabilitated Low sensitivity areas – but the feasibility of this is not known at present (although the Landscaping Plan shows that most of these areas will be at least partly rehabilitated with indigenous Renosterveld and Sand Fynbos plant mixes). From a botanical perspective most of these areas would be ecologically viable, especially if connected by ecological corridors. Key ecological management interventions required are ongoing alien invasive vegetation management (pre and post burn) and management burns in the appropriate autumn season (once every 8-12 years).
- The No Go alternative is difficult to assess, as future land management in the area is hard to predict, but no direct loss of Very High sensitivity areas

is likely, and most of the Medium and High sensitivity areas could be assumed to be likely to persist, but perhaps with no alien invasive plant management. Overall botanical impact is likely to be Low to Medium negative, depending on various factors.

- The overall botanical impact of the proposed development (Alternatives 2 and 3) is likely to be **Medium – High negative before mitigation**, driven mainly by the loss of at least part of the 1.6ha patch of Very High sensitivity Swartland Silcrete Renosterveld (Critically Endangered), and the two associated plant Species of Conservation Concern in this area. This impact is largely unavoidable, other than by runway layout alteration (not feasible). **After mitigation** this could be reduced to an acceptable **Low to Medium negative level,** provided that the required ongoing ecological management of the priority remaining natural areas on site is implemented, along with the securing and management an appropriate biodiversity offset of 77ha (off-site).
- There are no significant differences between Alternatives 2, 3 and 4 in terms of botanical impact.

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