SUMMARY OF

CALADENIA HUEGELII DISTRIBUTION

ON JANDAKOT AIRPORT

AND A WAY FORWARD

THE MANAGEMENT OF THIS RARE FLORA

Prepared for:

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May 2007

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Attachments

1. SUMMARY

Extensive ranges of studies have been undertaken on the Rare flora species - *Caladenia huegelii.* In recent years a range of botanical studies have been undertaken near the Jandakot Airport. These studies have highlighted the potential conflict between the expansion of the Jandakot Airport and the presence of patches of the *Caladenia huegelii.*

This summary provides an overview of the findings to date and a potential way forward to resolving the potential conflicts between conservation of the species and the development of Jandakot Airport.

One Declared Rare species (*Caladenia huegelii*) pursuant to Subsection 2 of Section 23F of the Wildlife Conservation Act 1950 and listed by the Department of Environment and Conservation (2006a) has been recorded in the south-eastern corner of the L2 area, south of Hope Road. This taxon is listed as Endangered pursuant to s179 of the Environmental Protection and Biodiversity Conservation Act 1999. No Priority flora species as defined by the Department of Environment and Conservation (2007a) were located during the survey in the Stage 1 area south of Hope Road.

The populations around Jandakot Airport include the main concentrations of the orchid species (Attachment 1). The occurrence of the higher population numbers of the orchid at Jandakot Airport and Ken Hurst Park highlight the significance of the plants at the Jandakot Airport.

In the past, this orchid has been translocated with some success, however the research is still in the early phases of development due to the complexities of the mycorrhizal association. Nevertheless this research provides a good basis for the potential to translocate some plants from the proposed disturbance area.

2. JANDAKOT AIRPORT BACKGROUND AND HISTORY

Jandakot Airport is the principle general aviation airport in Western Australia and is therefore strategically important to the growth and development of Western Australia's tourism, business and leisure industries.

The Jandakot Airport Master plan, prepared in accordance with the Airports Act 1996, was approved by the Minister for Transport and Regional Services on 3 January 2006. This master plan which provides the framework for development on the airport land, included the construction of a fourth runway and the development of 148 hectares of non-aviation land (Attachment 3).

Jandakot Airport Holdings have progressed the planning for the fourth runway and the 148 hectare development. As part of this process, flora surveys have identified a number of grand spider orchids (*Caladenia huegelii*) on site (Attachment 2) some of these are within the development area (Attachment 1).

Furthermore, Jandakot Airport Holdings has identified that additional access roads are required for emergency vehicle access, emergency egress and to service growth at the airport.

Jandakot Airport Holdings have therefore prepared a plan to show the proposed roads and the creation of an orchid park to protect the majority of orchids (Attachment 4).

Three major options for the preservation of the orchids were considered.

A. Retain orchids and develop around them.
B. Translocate all orchids within the development area, to Ken Hurst Park.
C. Retain the bulk of orchids in situ in an orchid park, and translocate the scattered and isolated occasional orchids into this park.

Although Ken Hurst Park are happy to accept the translocation of the orchids from Jandakot Airport, it was decided in consultation with Kings Park and Botanic Gardens, that the best option would be option C. The proposal is therefore, to swap the 10 ha of dieback infested bush for 10 ha of non-aviation development area. These 10 ha will protect 120 orchids in situ and 80 scattered orchids (beyond the main pockets of orchids) will be translocated into the orchid Park.

3. EXISTING ENVIRONMENT

The vegetation on the Jandakot Airport was mapped at the site-vegetation type level, utilizing the approach used by Havel (1968) on the northern Swan Coastal on the Bassendean and Spearwood dune systems (Mattiske Consulting Pty Ltd). The main structural formations within the survey area are (see Attachment 4):

- Woodland of *Eucalyptus marginata* with *Banksia* species (H1)
- Open Woodland of *Banksia attenuata – Banksia menziesii* (H2)
- Woodland of *Banksia ilicifolia* with *Banksia* species (J1)
- Open Forest of *Eucalyptus rudis* with *Melaleuca preissiana* (K1)
- Woodland of *Melaleuca preissiana* (K2)
- Largely cleared or disturbed areas

The underlying site conditions influenced the resulting vegetation types on the survey area. The soils are dominated by grey leached sands. As a result of considering both structural and floristic compositions and the site conditions, some four vegetation types were recorded in the L2 survey area. Of the four types within the L2 area, all but K1 are represented in other sections of the Jandakot Airport which are to be maintained as areas of native vegetation. The K1 community is represented in other reserves south and south-east of Jandakot Airport.

The percentage of this complex remaining as native vegetation within the Perth Metropolitan Region is 24% (Government of Western Australia 2000). The Jandakot Airport is located on the deeply leached sands of the Bassendean dune system. Jandakot Airport occurs on the Bassendean Complex - Central and South as defined by Heddle et al. (1980). This vegetation complex is represented by 24% native vegetation on the Swan Coastal Plain (Bush Forever, Government of Western Australia 2000). Since 2000, sections of the Banksia woodlands on the Swan Coastal Plain south of Perth have been cleared, so this estimate of extent left in native vegetation is possibly an over-estimation of the extent of the Banksia woodland left in the local and regional context.

The condition of the vegetation varies from completely degraded to very good (Attachment 6). The western end of the area is completely degraded and the condition ratings have declined since the earlier studies on the same area in 2001 (Mattiske Consulting Pty Ltd 2001a). The condition of a small section of the eastern dune supports a range of species. The condition of the vegetation also places additional impacts on the range of native species (both in terms of habitats and food supplies).

Deleted: eastern dune

4. BACKGROUND INFORMATION ON *CALADENIA HUEGELII*

The following background information on *Caladenia huegelii* was provided by Dr Kingsley Dixon from Kings Park and Botanic Garden:

"Distribution status and genetic diversity:

- Limited to approximately 1400 individuals, *C. huegelii* is restricted to *Banksia* woodlands on the Bassendean Sand System along the Swan Coastal Plain.
- The adjacent bushlands of Jandakot Airport and Ken Hurst Park contain almost two thirds the total number of known *C. huegelii*.
- *C. huegelii* is part of a broader phylogenetic group comprising eight species with *C. huegelii* closely aligned with the *C. thinicola, C. arenicola* and *C. georgeii* complex.

Mycorrhizal relationships:

- *C. huegelii* has a strictly obligate relationship with a fungal endophyte (Genus *Sebacina*) for germination, growth and development.
- The endophyte is functionally linked to the orchid in terms of nutritional needs for the life history of the plant.
- The endophyte of *C. huegelii* is rare and restricted in the natural environment and may be one of the principal causes of rarity in the species.

Pollination syndromes:

- The *C. huegelii* complex comprises orchid species characterized by a highly specific pollinator requirement involving native Thynnine wasps using a system of sexual deception for pollination.
- With an average of 4% of flowers successfully pollinated, natural seed set in this orchid is one of the lowest recorded for a sexually deceptive species.
- Little is known of the factors influencing the pollinating wasp abundance, distribution and pollinator activity.

Translocation and propagation knowledge:

- A specific fungal agent is required to germinate *C. huegelii* seed under *in situ* and *in vitro* conditions.
- Successful transfer to soil for seedlings of *C. huegelii* and other *Caladenia* species is low and erratic indicating a limitation in plant or fungal vigour.
- Natural recruitment of *C. huegelii* is low and rarely observed, balanced by adult plants surviving for 25 years or longer.

Germplasm conservation (*Ex situ* conservation)

- Seed and endophyte have been successfully stored in the cryogenic facilities at Kings Park for *Caladenia* species, however, long term viability of the collection needs to be established.
- Risk-management of the off-site germplasm collection has been established with the Millennium Seed Bank (MSB) at the Royal Botanic Gardens, Kew.

- A DNA bank for *Caladenia* including *C. heugelii* has been established at Kings Park and Botanic Garden as part of a national DNA bank for rare species.

5. PROPOSED WAY FORWARD

The way forward appears to require a compromise between the protection of some of the main occurrences of the orchid and the proposed development at site. The Jandakot Airport Holdings intends to set aside 10 hectares of bushland area that supports the rare orchid (*Caladenia huegelii*) and maintain the conservation zones as already established under the Jandakot Airport Master Plan. The latter conservation areas include some areas that support *Caladenia huegelii.*

It is intended that a research and management program for *Caladenia huegelii* will be undertaken by Kings Park and Botanic Gardens researchers through funding and on site assistance and management activities by the Jandakot Airport Holdings Pty Ltd. The specific aim of this research will be to ensure the longevity and increase the numbers of Caladenia huegelii. This approach will not only assist in improving the research of *Caladenia huegelii,* but will also assist in our understanding of other threatened and endangered *Caladenia* species in Western Australia.

As indicated in the attached research proposal by Kings Park and Botanic Gardens (Attachment 5) and as extracted below:

1. *Genetic fingerprints of targeted C. huegelii plants and indicative rare and threatened taxa (benchmarked as appropriate with common spider orchid taxa for comparative purposes).*
2. *Determination of key individuals or groups of plants considered genetically significant.*
3. *Optimisation of the propagation of orchids from seed through ex situ and in vitro methodologies.*
4. *Optimisation of the reintroduction and survival of orchid seedlings to field sites through scientific research and monitoring.*
5. *Ex situ conservation of genetically significant material (orchid seed and mycorrhizal fungi), identified from molecular genetics work.*
6. *Development of conservation initiatives for Caladenia pollination agents: thynnid wasps and host plants*
7. *Development of a Caladenia phylogeny with an extension to Arachnorchis sub-genus and resolution of species complexes in problematic species.*
8. *Collection and maintenance of the rescued plant material will be undertaken in summer 07/08 with plants to be maintained as a seed orchard for conservation production of seed for both reintroduction and long term seed banking.*

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